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DRIED MILK POWDER IN INFANT FEEDING.¹

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The infant mortality rate in 573 cities of the United States in 1921 varied from 24 in East Hartford, Conn., to 186 in Dunsmore, Pa., rates which, in addition to heredity and environmental conditions, are largely influenced by nutritional factors.

Various observers working in different communities have reported from 16 to 60 per cent of the children examined by them in the public schools and elsewhere as suffering from defective nutrition. Even if these estimates are only in part true, it is an undeniable fact that an unnecessarily large number of children do not get a fair start in life because of an improperly arranged diet or faulty dietary habits. It is now known that a diet composed of meat, bread, potatoes, and coffee does not supply all of the elements essential to the best development, and that it is necessary to supplement such a diet by the addition of fresh, leafy vegetables and milk in requisite quantity.

Furthermore, it is stated on competent authority that from 75 to 90 per cent of the children of 13 years of age and under have been infected with tuberculosis. It is also believed by many that the infection acquired during childhood may remain quiescent for years without apparent injurious effect and suddenly, as a result of unusual stress or strain, individual resistance is broken down and frank tuberculosis develops. While many factors contribute to this result, it is contended that the vital factor in this breakdown is nutritional, operating not so much because of an insufficiency of food as the failure properly to select and prepare the food comprising the habitual dietary. In other words, defective nutrition may be due not so much to lack of the principal food elements, such as the fats, starches, and proteins, as to a deficiency in the so-called accessory food factors. Nutritional factors, which seem to play a prominent part in the development of tuberculosis, also influence the development of a number of other diseases.

¹ From Field Investigations in Child Hygiene, United States Public Health Service, in cooperation with the Statistical Office, United States Public Health Service.

It is quite evident that any attempt to improve the national health and efficiency must include due consideration of the adequacy of the usual food supply. Owing to the fact that clean, fresh, cow's milk contains all the essential food elements in easily assimilable form, probably the most important nutrition problem is to secure an abundant and safe milk supply at reasonable cost.

From the standpoint of reducing the infant mortality rate and giving the miniature man and woman the best possible start in life, the advocates of preventive medicine have emphasized the importance of breast feeding. However, so many factors contribute toward making breast feeding impossible, undesirable, or neglected, that recourse must be had to substitutes in thousands of cases. Experience and the best medical judgment have confirmed the use of cow's milk as generally the best and most practical substitute for mother's milk. For this reason, measures to increase the quantity and quality of cow's milk at reasonable cost are in line with the best public health opinion and practice. However, despite the wonderful progress made along these lines, the public health official and pediatricist are confronted in many localities with the high cost, with the scarcity, with the impossibility of securing a safe supply, and with the inability of large numbers of householders properly to handle and preserve milk in the home.

Over large areas of our country, cow's milk is not produced in sufficient quantity to supply the local needs. One of the writers has recently visited a State where, in some localities, milk retails at \$1 a gallon, obviously beyond the means of a large part of the population. In other sections of this country it is produced in such quantity that much of it goes to waste, because of lack of transportation facilities, the cost of transportation, and the limit to the distance which milk may be transported, the factors of time and temperature operating to cause deterioration. It is for these reasons that inquiring minds have turned to the solution of these problems and sought to make generally available this valuable food product at reasonable cost. As a result, the dried milk products are coming into wider and wider use.

The value of dried milk as food for adults and older children has been repeatedly demonstrated. In this country, except in institutional cases, no study of any magnitude had been undertaken to establish its usefulness as an exclusive food for infants until that undertaken by the United States Public Health Service in August, 1919, in the city of Boston, in cooperation with the Boston Baby Hygiene Association, the Boston Health Department, and several other agencies. While the Public Health Service had already made some study of the vitamine content and growth-promoting values of dried

milk powder, this study in Boston was designed to determine the safety, usefulness, and comparative value of dried milk powder in infant feeding on a practical, community-wide basis.

The infants included in this study were not specially selected, but represented every type physically, and were recruited from all sorts and conditions of homes. The further requirements were that these infants should be entirely artificially fed, not more than 6 months old, and under the supervision of the Boston Baby Hygiene Association. For purposes of study they were divided into three groups: Group I, children fed on grade "A" milk;² Group II, children placed on whole milk powder which was reconstituted in their homes; and Group III, children placed on milk which had been reconstructed from unsalted butter and skimmed milk powder.

Method of preparing milk.—For Group I, the grade "A" milk was modified to meet the age and condition of individual babies.

For Group II an equivalent to $1\frac{1}{2}$ cupfuls (164 grms.) of the whole milk powder was added to 1 quart of cool boiled water. When measured, the powder was dipped from the tin with a large spoon and was not packed down. The powder and the water were thoroughly mixed with an egg beater. The constituents of the mixture approximated: Fat 4 per cent, sugar 5.7 per cent, protein 3.71 per cent. The amount of sugar in such a mixture is about 1 per cent higher than that in grade "A" milk. This fact was taken into consideration when ordering modification with this mixture as a basis.

For Group III the skimmed-milk powder and the sweet butter fat were emulsified by one of the large dairy companies of Boston and distributed to the homes of the children enrolled in this special study. The constituents of the reconstructed milk approximated: Fat 4 per cent, sugar 5.1 per cent, protein 3.1 per cent. The method of modification, consequently, was the same as that for grade "A" milk.

In addition to careful directions for the preparation of milk, the following data were recorded on the history cards of each baby:

1. The weight of the baby at the beginning of the special feeding and at intervals of approximately two weeks thereafter.
2. The strength and amount of feeding, hours of feeding, amount taken in 24 hours, and changes made.
3. The nature and extent of any illness and treatment.
4. General condition of the baby with special reference to character and changes in stools, general development, activity, teething, and disposition.
5. Environment of baby, with special reference to mother's intelligence and cooperation.

² Grade "A" milk is an unofficial locally known grade, but special precautions are taken during its production, handling, and distribution. It is pasteurized by the holding process, 145° F. for 30 minutes, at the plant of a large city milk dealer. This milk contains the following constituents. Fat, 4 per cent; sugar, 4.8 per cent; protein, 3.18 per cent. (The bacterial count of this milk ranges between 6,000 and 90,000, averaging 32,000 per c. c.)

In a preliminary report for the first three months during which these investigations were carried on, the results of dried-milk-powder feeding were analyzed in the cases of 287 infants, grouped as follows:

	Number.
Group I—Fed on grade A cow's milk.....	62
Group II—Fed on whole milk powder.....	178
Group III—Fed on reconstructed milk.....	47

The results seem to indicate (1) that the dried-milk powders and their remade products used in this study are safe for infant feeding; (2) that the average gain per baby per day in Group I was 0.629 ounce; in Group II, 0.880 ounce; and in Group III, 0.713 ounce; (3) that the opinions expressed by the nurses engaged in this investigation strengthen the conclusion that the reconstituted and reconstructed milks, of the brand employed, are safe and useful for infant feeding.

In order to evaluate the influence of changing climatic conditions and other factors and to secure additional data as a basis of comparison in respect of the trend of growth of the infants comprising the three groups, it was decided to continue this study for the period of a full year and to include (1) laboratory studies comprising examinations of milk prepared in homes of different degrees of cleanliness; (2) classification of the intestinal flora of a selected number of babies from each group; and (3) careful physical examination of babies of all groups with special reference to the incidence of rickets and scurvy. In addition, studies in the basal metabolism of a number of these babies were made by Dr. Fritz B. Talbot (2), of the Research Laboratory of the Massachusetts General Hospital.

STATISTICAL ANALYSIS OF GROWTH AND OTHER FACTORS.

Number of infants included in the study.—A total of 319 infants were enrolled for the study during the period August, 1919, to October, 1920. Of these, 241 were under observation for a sufficient length of time to furnish reliable data for use in tabulation of weights. No infant was included in the tabulation of results unless there was a record of weighings for at least four weeks. However, in a great majority of instances the weight records extended over a longer period. The number of infants included in each diet group is shown in Table I.

TABLE I.—*Total number of infants included in the feeding experiment and number whose records were utilized in the present tabulation in each diet group.*

	All diet groups.	Diet Group I.	Diet Group II.	Diet Group III.
Total infants enrolled for the experiment between August, 1919, and October, 1920.....	319	71	194	54
Infants taken off the experiment between August, 1919, and October, 1920 ¹	213	47	129	37
Infants on experimental diets 4 weeks or more between August, 1919, and October, 1920, whose records are utilized in this tabulation.....	241	63	138	40

¹ The following is a list of the babies who were discharged from this study and the reasons therefor:

	Group I.	Group II.	Group III.	Total.
Taken off because of age and diet.....	23	27	10	60
Taken off by "private" physicians.....	14	24	24	62
Taken off because families moved.....	14	15	6	35
Taken off by mothers.....	3	19	10	32
Taken off by hospitals.....	2	11	1	14
Taken off by conference doctors.....		16	10	26
Taken off because of lack of cooperation.....		9		9
Taken off because breast-milk returned and artificial feeding was no longer necessary.....		1		1
Died.....	5	7		12
Total.....	47	129	37	213

Of the 26 taken off by conference physicians, 5 had diarrhea, 4 had persistent vomiting, 16 failed to gain satisfactorily, and 1 had obstinate constipation.

Of the 26 taken off by conference physicians, 13 began to improve at once on natural milk, 6 showed fluctuating results for several weeks and then improved, 4 showed no improvement, 2 moved and follow-up work was impossible, and 1 developed tuberculosis (mother had died of this disease).

Following are the causes of death:

Cause.	Group I.	Group II.	Group III.	Total.
Diarrhea.....	2	3		5
Pneumonia.....	2	3		5
Acidosis.....		1		1
Diphtheria.....	1			1
Total.....	5	7		12

Two other deaths not included in this list occurred during the course of the demonstration. In both cases the babies had been on the powder only a few days and died from causes not attributable to feeding. They are recorded among those taken off by "private" physicians.

A larger number of infants were included in Group II, which comprised the children fed on reconstituted whole milk powder. Considerable difficulty was experienced in gaining the consent of mothers to place infants on reconstructed milk made from the skimmed milk powder and butter fat, which accounted for the relatively few infants included in Group III. This was due largely to two causes: In the first place to the necessity at the beginning of the study of educating the mothers to the use of this new variety (to them) of infant food, and in the second instance to the difficulty experienced in securing a perfect emulsion, a thin float of fat rising on the surface of the milk in the necks of the bottles. Although the fat lost was compensated for, still the appearance of the milk excited apprehension on the part of the mothers.

Age distribution.—With a few exceptions, no infants were included in this study who were over 6 months of age at the time they were put on the special diets. However, in the calculation of weights, no record was tabulated after the infant had reached 10 months of age or if it had begun to receive a mixed diet before reaching the age of 10 months. The number of infants in monthly age groups was so small that for the purpose of comparison they were combined with groups comprising infants of 1, 2, and 3 months of age, and of 4, 5, and 6 months of age.

TABLE II.—*Distribution according to age of infants on the experimental diets, by diet groups.*

Age in months. ¹	Number of infants.				Percentage of infants each month of age.			
	All diet groups.	Diet Group I.	Diet Group II.	Diet Group III.	All diet groups.	Diet Group I.	Diet Group II.	Diet Group III.
All ages.....	241	63	138	40	100.0	100.0	100.0	100.0
1.....	40	12	20	8	16.6	19.1	14.5	20.0
2.....	53	21	29	3	22.0	33.3	21.0	7.5
3.....	47	12	27	8	19.5	19.1	19.6	20.0
4.....	36	6	24	6	14.9	9.5	17.4	15.0
5.....	42	6	29	7	17.4	9.5	21.0	17.5
6.....	28	6	9	8	9.6	9.5	6.5	20.0
1 to 3, inclusive.....	140	45	76	19	100.0	100.0	100.0	100.0
1.....	40	12	20	8	28.6	26.7	26.3	42.1
2.....	53	21	29	3	37.8	46.6	38.2	15.8
3.....	47	12	27	8	33.6	26.7	35.5	42.1
4 to 6, inclusive.....	101	18	62	21	100.0	100.0	100.0	100.0
4.....	36	6	24	6	35.6	33.3	38.7	28.6
5.....	42	6	29	7	41.6	33.3	46.8	33.3
6.....	23	6	9	8	22.8	33.3	14.5	38.1

¹ Classified according to the nearest month of age.

In each case the percentage seems to indicate a fairly similar age distribution in each diet group. The data seem reasonably comparable for 3-month age groups and, with broad limitations, fairly comparable for the total groups of all ages.

Seasonal distribution.—In order to evaluate the effect of change in climatic conditions, 241 infants observed during the period August, 1919, to October, 1920, were tabulated according to the month in which they were put on the several diets, and a study of the percentages for each month showed that the distribution of the infants between the different months of the year was not markedly dissimilar in the three feeding groups. The seasonal elements, therefore, should have affected the average growth of the infants in each group in approximately the same degree.

Physical condition.—Practically 80 per cent of the infants included in the statistical study of this demonstration were given at least one

thorough physical examination by a physician at some time during the period of investigation. Approximately one-half of the infants examined were given more than one examination to determine any change in the physical condition since the previous examination. Each child examined was rated as in "good," "fair," or "poor" physical condition. These ratings were made on the basis of the child's physical make-up rather than on the temporary condition existing at the time of the examination. That is, an infant having diarrhea at the time of examination was rated as "good" in spite of this handicap, provided his general physical condition warranted such rating.

TABLE III.—*Distribution according to physical condition of the infants who were examined at least once during the experiment, by diet and age groups.*

Age group and physical condition.	Number of infants.				Percentage of infants in each physical condition.			
	All diet groups.	Diet Group I.	Diet Group II.	Diet Group III.	All diet groups.	Diet Group I.	Diet Group II.	Diet Group III.
All ages:								
Total examined.....	192	46	119	27	100.0	100.0	100.0	100.0
Good.....	65	18	39	8	33.9	39.1	32.8	29.6
Fair.....	116	24	73	19	60.4	52.2	61.3	70.4
Poor.....	11	4	7	0	5.7	8.7	5.9	.0
1-3 months, inclusive:								
Total examined.....	108	29	65	14	100.0	100.0	100.0	100.0
Good.....	41	12	21	8	38.0	41.4	32.3	57.1
Fair.....	58	14	38	6	53.7	48.3	58.5	42.9
Poor.....	9	3	6	0	8.3	10.3	9.2	.0
4-6 months, inclusive:								
Total examined.....	84	17	54	13	100.0	100.0	100.0	100.0
Good.....	24	6	18	0	28.6	35.3	33.3	.0
Fair.....	58	10	35	13	69.0	58.8	64.8	100.0
Poor.....	2	1	1	0	2.4	5.9	1.9	.0

It may be observed that over 90 per cent of the infants in each diet group were rated as either in "fair" or "good" physical condition. This is a very satisfactory showing, especially in view of the fact that the number of infants examined had been on these special diets for a considerable length of time prior to the physical examination.

Morbidity.—Owing to the fact that the number of infants in any particular age group was not large, it was deemed inadvisable to subdivide these groups into the well and sick, because of the unreliability of results based on a small number of cases which would have resulted from such classification.

TABLE IV.—Cases of illness occurring among infants on the experimental diets, and the rate per 1,000 infants, by diet groups.¹

Disease.	Cases of illness.				Cases of illness per 1,000 infants.			
	All diet groups.	Diet Group I.	Diet Group II.	Diet Group III.	All diet groups.	Diet Group I.	Diet Group II.	Diet Group III.
All illness.....	146	37	82	27	458	521	423	500
Diarrhea.....	80	19	50	11	251	268	258	204
All illness other than diarrhea....	66	18	32	16	207	254	165	296
Whooping cough.....	18	7	9	2	56	90	46	37
Pneumonia.....	17	5	7	5	53	70	36	93
Bronchitis.....	12	1	6	5	38	14	31	93
Measles.....	8	2	5	1	25	28	26	19
Influenza.....	3	1	1	1	9	14	5	19
Chicken pox.....	2	1	1	0	6	14	5	0
Meningitis.....	2	0	2	0	6	0	10	0
Mumps.....	1	0	0	1	3	0	0	19
Diphtheria.....	1	1	0	0	3	14	0	0
Tonsillitis.....	1	0	0	1	3	0	0	19
Acidosis.....	1	0	1	0	3	0	5	0

¹ Based on a total of 319 infants on experimental diets during the experiment: Group I, 71; Group II, 194; Group III, 54.

As shown in the above tables the physical condition and sickness among the infants of the three diet groups was sufficiently similar to render them reasonably comparable. In other words, the physical condition as revealed by medical examination was rated so high in such a large percentage of cases that the influence of intercurrent sickness was considered negligible in calculating the effect of special diets on growth as measured by gain in weight.

Effect on growth.—Gain in weight alone may not be considered sufficient evidence on which to base final conclusions relative to the values of the special diets prescribed in these studies. However, it probably offers the most reliable index for mathematical demonstration, especially when taken in connection with observations of the general development, activity, and disposition of individual infants.

In determining the average weights, the infants were classified in two age groups, those 1 to 3 months of age, inclusive, and those 4 to 6 months, inclusive, at the time they began on the special diets. All physical conditions were included in each age group. The small numbers, especially in diet Groups I and III, made it inadvisable to further subdivide the data.

TABLE V.—Number of infants (all ages), mean weights, and indices of weights for each week under observation, by diet groups.

Weeks under observation.	Number of infants on each diet.			Mean weights, in pounds, of infants on each diet.			Indices of mean weights of infants. ¹		
	Diet Group I.	Diet Group II.	Diet Group III.	Diet Group I.	Diet Group II.	Diet Group III.	Diet Group I.	Diet Group II.	Diet Group III.
Beginning.....	63	138	40	9.95	10.00	10.95	100.0	100.0	100.0
1.....	63	138	40	10.26	10.42	11.38	103.1	104.0	103.7
2.....	63	138	40	10.57	10.77	11.72	106.1	107.7	107.0
3.....	63	138	40	10.84	11.12	12.05	109.0	111.1	110.2
4.....	63	138	40	11.13	11.44	12.44	112.0	114.4	113.7
5.....	63	138	39	11.45	11.77	12.85	115.1	117.8	117.1
6.....	63	133	38	11.76	12.14	13.16	118.2	121.2	119.8
7.....	63	126	35	12.06	12.44	13.35	121.1	124.6	122.1
8.....	63	123	30	12.33	12.81	13.60	123.7	127.8	125.0
9.....	60	120	28	12.54	13.08	14.13	126.3	130.9	128.6
10.....	60	116	28	12.84	13.38	14.50	129.0	134.2	132.0
11.....	60	109	28	13.14	13.79	14.73	131.6	137.6	134.8
12.....	57	108	25	13.30	14.11	15.05	134.5	141.0	137.0
13.....	55	107	24	13.71	14.41	15.22	138.7	144.0	139.0
14.....	53	102	22	13.80	14.67	15.38	139.3	146.9	140.5
15.....	52	99	21	14.06	14.98	15.55	141.6	149.8	142.4
16.....	51	90	21	14.40	15.28	15.80	144.2	152.4	144.6
17.....	45	87	20	14.59	15.45	16.11	146.7	155.0	146.8
18.....	44	85	20	14.80	15.77	16.26	147.9	157.6	148.2
19.....	42	79	18	14.77	16.07	16.32	149.8	160.5	149.8
20.....	40	73	16	15.15	16.32	16.28	150.9	162.4	150.0
21.....	37	69	14	15.11	16.34	16.68	152.7	164.4	150.8
22.....	37	61	11	15.32	16.67	16.56	154.0	166.2	152.4
23.....	35	54	9	15.53	16.85	16.83	155.7	168.7	152.9
24.....	34	47	8	15.62	17.09	16.82	156.4	170.7	154.4
25.....	32	39	6	15.53	17.23	17.07	156.2	172.6	156.9
26.....	29	36	5	15.46	17.41	17.65	156.2	174.7	159.9
27.....	29	33	5	15.63	17.73	17.81	156.9	177.2	161.6
28.....	28	26	.....	15.73	18.01	.....	158.7	178.9	.....
29.....	22	19	.....	16.01	17.92	.....	161.4	180.0	.....
30.....	20	18	.....	16.43	18.06	.....	164.5	180.6	.....
31.....	20	17	.....	16.68	18.19	.....	166.6	181.4	.....
32.....	18	15	.....	16.63	18.17	.....	167.2	183.5	.....
33.....	17	12	.....	16.60	18.70	.....	166.6	187.1	.....
34.....	15	10	.....	16.50	19.25	.....	168.8	191.8	.....
35.....	13	10	.....	16.70	19.59	.....	167.5	195.5	.....

¹ Computed from a 3-week moving average.

Table V shows by diet groups the number of infants under observation each week, the average weight of each group for each week, and a series of weekly index numbers of the average weights.³ Tables VI

³ In order to obtain a series of weekly weights for each of the three groups, the following procedure was employed: After combining the individuals into special groups for comparison (according to kind of diet, age, etc.), the recorded weights for each infant were plotted, using as abscissæ the number of days the child had been on the specified diet. Thus, in the case of each infant, the date on which it was put on the diet was plotted as 0, the second day 1, the third 2, and so on. A curve (smoothed by inspection, but plotted through each point) was then drawn for each infant. The weights at the end of each seven-day period were then read from these curves, added together for each group of individuals, and the arithmetic mean computed. The resulting figures are a series of weekly average weights for the various groups based on the individual curves derived from the somewhat irregular record for each infant. The facts that in the majority of instances the weighings were quite frequent and at fairly regular intervals, and that a remarkably smooth series of group curves was finally obtained, afford reasonably certain grounds for believing that a fairly accurate series of group pictures of the growth of the infants was obtained.

Although a considerable number of infants were taken off the experimental diets during the course of the study, it is believed that those remaining in any given diet group did not constitute a selected class

and VII show the same data for the two subgroups—the infants 1 to 3 months of age, inclusive, and those 4 to 6 months of age, inclusive.

TABLE VI.—*Number of infants 1 to 3 months of age (inclusive), mean weights, and indices of weights for each week under observation, by diet groups.*

Weeks under observation.	Number of infants on each diet.			Mean weights, in pounds, of infants on each diet.			Indices of mean weights of infants. ¹		
	Diet Group I.	Diet Group II.	Diet Group III.	Diet Group I.	Diet Group II.	Diet Group III.	Diet Group I.	Diet Group II.	Diet Group III.
Beginning.....	45	76	19	8.82	8.48	9.26	100.0	100.0	100.0
1.....	45	76	19	9.13	8.84	9.64	103.4	104.0	104.0
2.....	45	76	19	9.41	9.15	9.99	105.6	108.1	107.7
3.....	45	76	19	9.66	9.51	10.29	109.6	112.0	111.7
4.....	45	76	19	9.94	9.84	10.74	112.8	116.0	116.4
5.....	45	76	18	10.24	10.17	11.32	116.1	120.0	121.1
6.....	45	72	17	10.53	10.53	11.58	119.8	124.1	125.3
7.....	45	69	16	10.80	10.85	11.90	122.4	128.3	128.5
8.....	45	66	15	11.07	11.27	12.23	125.4	132.5	132.9
9.....	43	65	13	11.31	11.60	12.79	128.6	138.4	137.6
10.....	43	63	13	11.63	11.83	13.19	131.7	140.4	142.0
11.....	43	58	13	11.93	12.30	13.48	135.0	144.6	145.2
12.....	42	57	12	12.17	12.65	13.67	138.5	148.9	148.3
13.....	40	56	12	12.55	12.95	14.04	141.7	152.4	150.1
14.....	40	55	11	12.78	13.16	13.99	144.9	156.0	152.5
15.....	39	54	11	13.01	13.57	14.34	148.0	159.3	154.9
16.....	38	50	11	13.37	13.81	14.69	151.6	163.2	158.4
17.....	34	50	10	13.74	14.14	14.99	155.3	167.0	161.4
18.....	34	49	10	13.99	14.52	15.18	158.4	171.5	162.6
19.....	34	45	9	14.18	14.97	15.01	161.6	175.7	163.5
20.....	32	40	9	14.58	15.20	15.23	164.1	179.4	166.7
21.....	30	40	8	14.64	15.47	16.09	166.4	183.3	171.5
22.....	30	37	8	14.82	15.95	16.31	168.1	187.4	177.0
23.....	30	36	7	15.04	16.25	16.76	170.6	191.9	179.3
24.....	30	34	6	15.28	16.61	16.73	172.8	195.2	182.1
25.....	29	31	4	15.39	16.78	17.08	174.3	198.2	184.3
26.....	27	29	4	15.45	17.04	17.41	175.6	201.4	187.5
27.....	27	27	4	15.62	17.43	17.58	177.1	205.4	189.4
28.....	27	22	4	15.79	17.80	17.63	179.3	209.0	190.5
29.....	22	19	4	16.01	17.92	17.70	182.3	211.4	191.1
30.....	20	18	4	16.43	18.05	17.77	185.6	213.0	195.9
31.....	20	17	.....	16.68	18.19	.....	188.0	213.9	.....
32.....	18	15	.....	16.63	18.17	.....	188.7	216.4	.....
33.....	17	12	.....	16.60	18.70	.....	188.0	220.6	.....
34.....	15	10	.....	16.50	19.25	.....	188.2	226.2	.....
35.....	13	10	.....	16.70	19.59	.....	189.0	230.5	.....

¹ Computed from a 3-week moving average.

which was not comparable to the other groups. This belief is strengthened by the fact that the weight curves (indices of weights) diverge consistently even during the first four weeks under observation, during which time the numbers of infants on each given diet remained the same. Infants who did not remain on the diet at least four weeks were not included, since the time seemed insufficient to judge the effect of the diet.

It was noted that there were a few irregularities in the average weights, especially in Group III, which contained the smallest number of infants. In order to eliminate these irregularities, a moving average was computed. A three-week period was used in order that significant changes would not be obscured. For the purpose of facilitating the comparison of the average weights for the three diet groups indices were computed on the smoothed weights for each group. The average weight at the beginning was used as the base, since it was the starting point of different diets and would therefore be the starting point of any diverging rates of growth which might result.

TABLE VII.—*Number of infants 4 to 6 months of age (inclusive), mean weights and indices of weights for each week under observation, by diet groups.*

Weeks under observation.	Number of infants on each diet.			Mean weights, in pounds, of infants on each diet.			Indices of mean weights of infants. ¹		
	Diet Group I.	Diet Group II.	Diet Group III.	Diet Group I.	Diet Group II.	Diet Group III.	Diet Group I.	Diet Group II.	Diet Group III.
Beginning.....	18	62	21	12.77	11.87	12.48	100.0	100.0	100.0
1.....	18	62	21	13.10	12.36	12.96	102.7	103.9	103.4
2.....	18	62	21	13.47	12.75	13.29	105.3	107.3	106.6
3.....	18	62	21	13.77	13.10	13.65	108.0	110.2	109.3
4.....	18	62	21	14.13	13.39	13.98	110.6	113.0	111.6
5.....	18	62	21	14.46	13.73	14.17	113.4	115.6	113.8
6.....	18	61	21	14.84	14.04	14.45	116.2	118.3	115.4
7.....	18	57	19	15.22	14.35	14.57	118.9	120.7	117.5
8.....	18	57	15	15.49	14.61	14.97	121.0	123.0	119.7
9.....	17	55	15	15.63	14.83	15.29	122.7	125.4	122.6
10.....	17	53	15	15.90	15.22	15.63	124.5	127.9	124.8
11.....	17	51	15	16.18	15.49	15.82	126.7	130.4	127.6
12.....	15	51	13	16.45	15.74	16.35	129.1	132.7	129.7
13.....	15	51	12	16.82	16.01	16.41	131.0	135.3	132.3
14.....	13	47	11	16.92	16.44	16.76	133.0	137.9	133.7
15.....	13	45	10	17.21	16.67	16.89	134.5	141.0	135.5
16.....	13	40	10	17.39	17.12	17.08	135.2	143.2	136.8
17.....	11	37	10	17.22	17.22	17.23	136.1	145.5	137.9
18.....	10	36	10	17.53	17.47	17.33	135.8	146.7	139.4
19.....	8	34	9	17.25	17.53	17.63	136.3	147.9	140.5
20.....	8	33	7	17.45	17.68	17.63	135.3	148.2	140.9
21.....	7	29	.....	17.14	17.55	.....	135.9	148.8	.....
22.....	7	24	.....	17.46	17.76	.....	138.6	149.9	.....
23.....	.....	18	.....	.....	18.05	.....	.....	152.1	.....
24.....	.....	13	.....	.....	18.34	.....	.....	156.1	.....

¹ Computed from a 3-week moving average.

Figure I shows by diet groups the indices of the mean weights of infants of all ages and in each of the age groups used. All three charts are drawn on logarithmic scale and, therefore, show the proportional increase in mean weight in each diet group.

In all age classes, the infants fed on a modification of cow's milk (Group I) made distinctly less progress, as measured by gain in weight, than those fed on a modification made from whole-milk powder. This difference was especially marked in the younger group (1 to 3 months). For example, the average weights of infants in the one to three months of age class at the beginning of the special feeding was 8.82, 8.48, and 9.26 pounds for Groups I, II, and III, respectively, and in the fourth week the average weights were 9.94, 9.84, and 10.74 pounds, with indices of 112.8, 116.0, and 116.4. In the twenty-fourth week the average weights for each group was 15.28, 16.61, and 16.73 pounds, with indices of 172.8, 195.2, and 182.1, respectively.

The infants fed on a modification reconstructed from unsalted butter and skimmed-milk powder (Group III) increased less rapidly in weight in the older age group (4 to 6 months) and in the total group (all ages), but in the younger age group (1 to 3 months) the

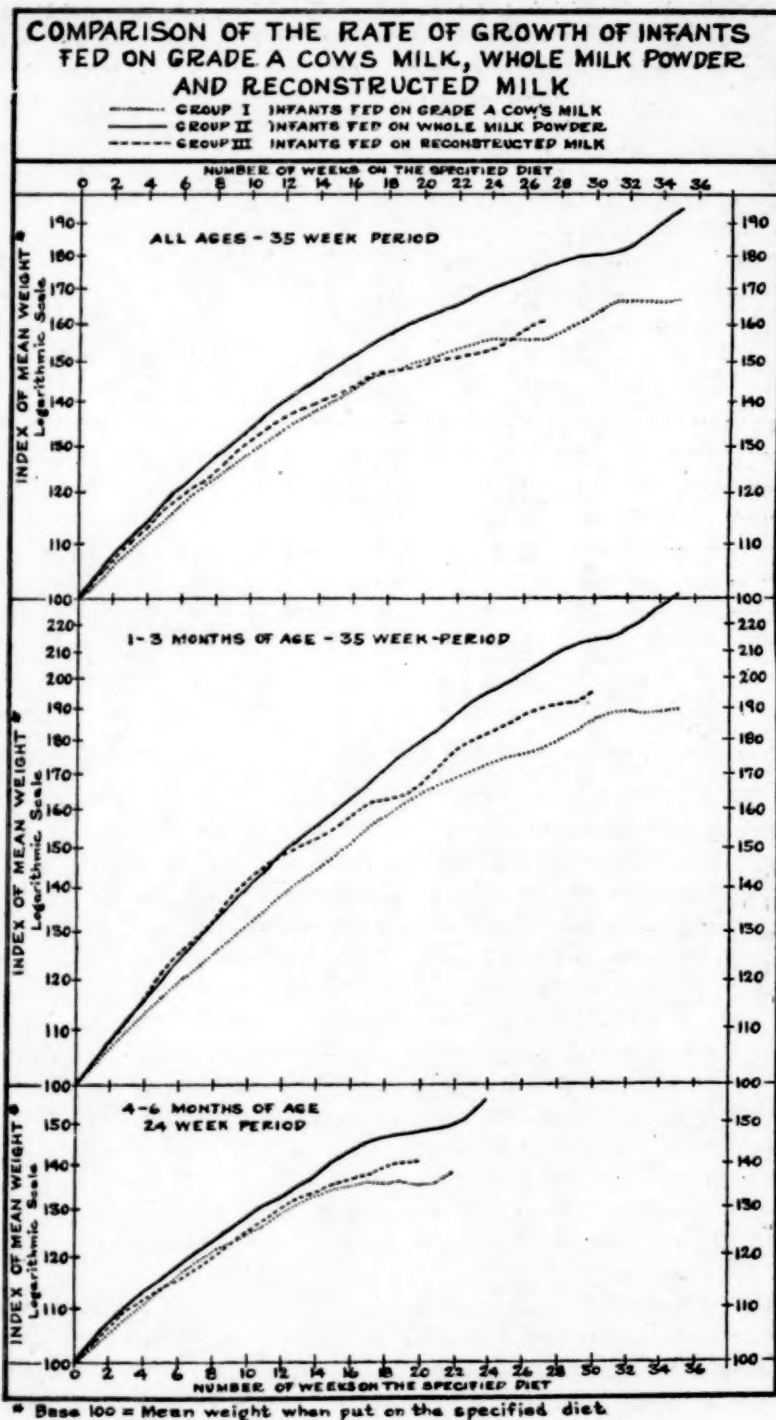


FIGURE 1.

gain in weight closely approximated that of the infants on whole-milk powder (Group II) for about 11 weeks, but after the twelfth week on this diet the rate decreased and the curve approaches that of Group I.

Since the weight curves for Group I are consistently below those for Group II in all three age classes, it seems safe to conclude that the infants on whole milk powder gained in weight more rapidly than did those fed on cow's milk. However, in regard to Group III, where the number of infants under observation was small and the weight curves do not show as consistent variations, no definite conclusions can be drawn from the statistical data.

LABORATORY STUDIES.⁴

In addition to careful studies in metabolism, rate of gain in weight, and the physical development of the babies included in this study, bacteriological investigation of the intestinal flora was undertaken.

From a technical standpoint these studies should properly have been made in an institution to insure complete control of the diet; but it was found to be impossible to secure institutional accommodations for babies in sufficient number to give reliable statistical results. For this reason it was necessary to visit the homes in order to obtain fresh specimens of infants' stools. The specimens of stools were collected between 8 and 10 o'clock in the morning, by an assistant who visited each house. A glass tube about one-half centimeter in diameter was removed from a sterile test tube, inserted in the rectum, and then returned to the test tube and placed in a container with ice until examined.

The results of this study are based on 110 specimens, received from 24 babies through a period of 10 weeks. The maximum number of times specimens were obtained from the same baby was 7, and the average number was 4.6. No data were included in calculations in the case of babies from whom specimens had been obtained less than twice.

Specimens from two breast-fed babies were used as controls, which formed an interesting comparison with the groups fed on grade A milk, the whole milk powder, and emulsified milk, respectively.

Effect on the intestinal flora.—According to Kendall (3) the substitution of cow's milk for human milk causes *B. bifidus* to tend to disappear. Porter (4) also calls attention to the antagonism between the acidophilic flora produced under human milk and other high sugar feedings, and the alkali-loving proteolyzers that inhabit the intestinal tract of children taking cow's milk or other foods high in animal protein.

⁴ Space for these bacteriological studies was set aside in the laboratories of the Harvard Medical School through the courtesy of Prof. M. J. Rosenau, whose advice and assistance in this work were of great value.

In these studies it was found that the substitution of powdered milk for ordinary cow's milk causes the gram positive bacilli to tend still further to disappear. In this respect the emulsified milk causes the same effect as the whole milk powder, the difference being but 0.5 per cent.

TABLE VIII.—*The average percentage bacterial count of smears from "stock dilution" of stools.*

	Breast-fed.	Grade "A" (Group I).	Whole-milk powder (Group II).	Emulsified milk (Group III).
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Gram negative organism.....	7	23.2	24.5	24.2
Gram positive organism.....	93	76.8	75.5	76.8
Gram positive rod.....	97.5	54.7	43.6	42.1
Gram positive coccus.....	2.5	45.3	56.4	57.9

A study of the total count of the microorganisms in the stools shows the lowest count for the breast-fed babies, with Group II (receiving whole-milk powder) second.³

TABLE IX.—*Average of total counts of microorganisms.*

	Number per mg.
Breast-fed.....	324,000
Group II, whole-milk powder.....	980,000
Group I, grade "A".....	1,130,000
Group III, emulsified.....	1,140,000

The groups fed with milk handled commercially manifested a tendency to a group rise in total count of microorganisms during a hot week, while the whole-milk powder group showed a scattered rise. This would seem to indicate that the babies fed a milk prepared in the home under reasonable precautions had greater chances of escaping digestive disturbances during hot weather than those receiving a dairy-handled product.

Bacterial count of the several milks used.—A freshly opened can of whole-milk powder had a count of 1,600 per c. c. when made up. Skimmed-milk powder showed a count of 27,000 under the same conditions. Unsalted butter had a count of 1,900,000 microorganisms, showing that the product as furnished to the baby is much higher in bacterial content than whole-milk powder. During the hot days the count for grade "A" milk ran as high as 200,000 per c. c., and the count for emulsified milk as high as 100,000 per c. c.

Effect of holding and of the addition of lactose on the bacteriological content.—It seemed desirable to determine the rise in the bacteriologi-

³ It is worthy of note that the prepared food which was shown in the laboratory to be lowest in bacterial count is the same which was fed to the group showing the lowest total count of the stool (breast-fed babies not considered).

cal count after holding the various milks for stated periods. Studies were also made to determine whether or not raising the percentage of lactose in these milks exercised any effect on the bacteriological content. It was found that the lactose played little, if any, part in the keeping qualities of these milks, while the effect of holding at 30° C. for seven hours is marked.

TABLE X.—Showing the effect of adding lactose and of "holding"—Counts of micro-organisms.

	Whole milk powder (Group II).	Grade "A" milk (Group I).	Emulsified milk (Group III).
1. Without lactose, plated directly.....	1,300	68,000	99,000
2. With lactose, plated directly.....	1,300	79,000	108,000
3. No lactose, held 7 hours at 30° C.....	87,000	19,000,000	28,000,000
4. With lactose, held 4 hours at 30° C.....	89,000	19,000,000	28,000,000

From the bacteriological standpoint it would seem that powdered milk, and especially the whole milk powder, can be safely used for feeding infants where a good grade of fresh cow's milk can not be obtained.

THE RELATION OF DRIED MILK TO SCURVY.

The relation of dried milk to scurvy is dependent upon the antiscorbutic vitamine content of the particular dried milk in question. Dried milks, like fresh milks, vary considerably in this respect. The observations of Hopkins, Chick, Hume, Skelton, and Barnes (5, 6, 7) led to the conclusion that the amount of vitamine C (the antiscorbutic vitamine) even in fresh milk is not large, but is sufficient to protect from scurvy, and has even some curative value if given in suitable quantity (7, 8, 9). An infant requires at least 1 pint, or about 500 c. c., of fresh raw milk daily to protect it from scurvy (10, 11). But the variation of milk in respect of vitamine must be taken into consideration. It appears to be definitely established that the diet of the cow has a marked effect upon the antiscorbutic content of her milk (12, 13, 14), and it follows that summer milk from pasture-fed cows has the higher value. It is stated that 20 c. c. of summer milk is better than 60 c. c. of winter milk (12). Fresh summer milk, used soon after it is drawn, has definite antiscorbutic value. It has been very generally believed that the process of drying milk reduces or destroys its antiscorbutic value, and it is probably safer, in infant feeding, to proceed on this assumption and adhere closely to the policy of including an additional antiscorbutic in the dietary. Hess, however, states that drying does not necessarily destroy the antiscorbutic factor (15, 16), and Rosenau has more

recently expressed the same opinion (17). To obtain a dried milk of highest antiscorbutic value, it is necessary that the milk to be used should be fresh and of high antiscorbutic value, exposed to a high temperature for not longer than one minute, protected from light, air, and alkalization, and used within a few months of the time of manufacture.

The mothers of infants under the supervision of the Boston Baby Hygiene Association are, as a routine procedure, instructed regarding the use of orange juice in feeding babies and advised to begin the administration at an early age. Thirteen of the babies included in the study failed, for various reasons, to get orange juice, and two of them developed symptoms of scurvy—one an infant on grade "A" milk (Group I), and one on reconstructed milk (Group III). These cases were quickly detected and responded promptly to treatment. Owing to the many factors affecting the antiscorbutic potency of milk, it is good pediatric practice to prescribe orange juice for infants fed on any kind of heated milk. .

THE RELATION OF DRIED MILK TO RICKETS.

The relation of diet to the development of rickets is far less simple and clear-cut than its relation to scurvy. Winfield observed no greater liability to rickets in infants fed on dried milk than on fresh milk (18). If the milk is dried by a very rapid process, the calcium salts are probably but little affected, since it has been noted that their precipitation depends upon the length of time the milk is heated (19). Vitamines A and B are considered to be of almost equal value in dried and fresh milk (10, 19, 20, 21, 22). In 1918 Hume (24) stated that fresh milk, butter, and cod-liver oil are the best available preventives of rickets. The next year Mellanby's (24, 25) investigations suggested the possibility that rickets is a true deficiency disease due primarily to a lack of the fat-soluble vitamine. Hopkins and Chick (6) supported this view and went so far as to call fat-soluble A the antirachitic factor. The Medical Research Council (22) in its 1919 report also gave favorable consideration to this theory. In the following year (1920), however, Hess (26), Hess and Unger (27), and McCollum, Simmonds, and Parsons (28) expressed the opinion that rickets is not a deficiency disease in the sense that it is due to the absence of a specific vitamine in the diet. Hess and Unger called attention to the fact that infants on a diet containing large quantities of milk rich in fat-soluble vitamine, as well as protein and salts, frequently develop rickets. In a communication published in 1920 Mellanby (29) observed that the balance between the other elements of the diet, as well as the accessory food factors, is of importance in the development of rickets. Hess (16) in 1921 gave a preliminary

report of some work in infant feeding which seems to show conclusively that the fat-soluble vitamine as it exists in milk is not the antirachitic factor. The recent observation of Paton and Watson (30) supports the view of Hess. McCollum and his colleagues (31) have very recently (June, 1922) published the results of experiments which differentiate between vitamine A and a vitamine which promotes calcium deposition. It seems that neither dried nor fresh milk can be considered a determining factor, as far as can be at present determined, in the prevention of rickets. Its value in this disease may be looked upon as due to its general value as a foodstuff.

A complete physical examination was made of 200 infants enrolled in this study and particular attention was paid to the incidence of rickets. One of the important points brought out by these examinations is the frequency and the similar distribution of this disorder in the different feeding groups. However, a number of these infants undoubtedly presented a slight degree of rickets at the time of enrollment; but owing to the relatively short period of observation in individual cases it is impossible to state with positiveness the effect of dried milk feeding on the course of the disorder.

In this connection it is important to note that the infants studied were recruited from homes of varied economic and hygienic status and fed on milk products containing fat in the usual percentage, which seems to indicate that other factors than a deficiency in the fat-soluble vitamine must be taken into consideration in any attempt to determine the true cause of rickets.

In conclusion, it can be said that the results of this more extended study tend to confirm the conclusions in the preliminary report, which were based on observations extending over a period of relatively short duration, that the dried milk powders and their remade products used in this study are safe for infant feeding, and in some cases seem to have distinct therapeutic value.

BIBLIOGRAPHY.

- (1) Price, W. H.: Dried milk powder in infant feeding. *Public Health Reports*, Apr. 2, 1920, pp. 809-828. (Reprint No. 588.)
- (2) Talbot, Fritz B.: Basal Metabolism of infants fed on dry milk powder. *Public Health Reports*, Jan. 20, 1922, pp. 116-123. (Reprint No. 724.)
- (3) Kendall, A. I.: *Bacteriology*. Lea and Febiger. 1916.
- (4) Porter, L.: *American Journal of Diseases of Children*, October, 1919.
- (5) Chick, H., Hume, E. M., and Skelton, R. F.: The antiscorbutic value of cow's milk. *Biochem. Jour.*, 1918, 12, 131-153.
- (6) Hopkins, F. G., and Chick, H.: Accessory factors in food. *The Lancet*, 1919, II, 28-29.
- (7) Barnes, R. E., and Hume, E. M.: Comparison between the antiscorbutic properties of fresh, heated, and dried cow's milk. *The Lancet*, 1919, II, 323-324.

- (8) Dalyell, E. J.: A discussion of the present position of vitamins in clinical medicine. *Brit. Med. Jour.*, 1920, II, 147.
- (9) Hart, E. B., Steenbock, H., and Smith, D. W.: Studies of experimental scurvy—Effect of heat on the antiscorbutic properties of some milk products. *Jour. Biol. Chem.*, 1919, 38, 305-324.
- (10) Hess, A. F., and Unger, L. J.: Scurvy VIII. Factors affecting the antiscorbutic value of foods. *Amer. Jour. Dis. Children*, 1919, 17, 221-240.
- (11) Harden, A.: Vitamins and the food supply. *Jour. Soc. Chem. Ind. (Review)*, 1921, 40, 79-82.
- (12) Dutcher, R. A., Eckles, C. H., Dahle, C. D., Mead, S. W., and Schaefer, O. G.: Vitamine studies VI. The influence of the diet of the cow upon the nutritive and antiscorbutic properties of cow's milk. *Jour. Biol. Chem.*, 1920, 45, 119-132.
- (13) Hess, A. F., Unger, L. J., and Supplee, G. C.: Relation of fodder to the antiscorbutic potency and salt content of milk. *Jour. Biol. Chem.*, 1920, 45, 229-235.
- (14) Hart, E. B., Steenbock, H., and Ellis, N. R.: Influence of diet on the antiscorbutic potency of milk. *Jour. Biol. Chem.*, 1920, 42, 383.
- (15) Hess, A. F., and Unger, L. J.: Scurvy of guinea pigs III. Effect of age, heat, and reaction on antiscorbutic foods. *Jour. Biol. Chem.*, 1919, 38, 293.
- (16) Hess, A. F.: Newer aspects of some nutritional disorders. *Jour. Amer. Med. Assoc.*, 1921, 76, 693-700.
- (17) Rosenau, M. J.: Vitamins in milk. *Boston Med. and Surg. Jour.*, 1921, 184, 455.
- (18) Winfield, Geo.: Food report No. 24, Local Government Board of Great Britain, 1918. 139-156.
- (19) Daniels, A. L., Loughlin, R.: A deficiency in heat-treated milks. *Jour. Biol. Chem.*, 1920, 44, 381-397.
- (20) Barnes, R. E., and Hume, E. M.: Relative antiscorbutic value of fresh, dried, and heated cow's milk. *Biochem. Jour.*, 1919, 13, 306-327.
- (21) Karr, W. G.: Some effects of water-soluble vitamins on nutrition. *Jour. Biol. Chem.*, 1920, 44, 255-276.
- (22) Medical Research Committee Special Report, Series No. 38, 1919.
- (23) Hume, E. M.: Vitamins in war-time diets. *Jour. Soc. Chem. Ind. (Review)*, 1918, 37, 75.
- (24) Mellanby, E.: An experimental investigation of rickets. *The Lancet*, 1919, II, 407-412.
- (25) Mellanby, E.: The part played by accessory food factors in the etiology of rickets. *Proc. Soc. Physiol. Jour. Physiol.*, 1919, 52, 53.
- (26) Hess, A. F.: The rôle of fat-soluble vitamins in human nutrition and its suggested relation to rickets. *Proc. Am. Soc. Biol. Chem. Jour. Biol. Chem.*, 1920, 41, 32-33.
- (27) Hess, A. F., and Unger, L. J.: Clinical rôle of the fat-soluble vitamins. Its relation to rickets. *Jour. Am. Med. Assoc.*, 1920, 74, 217-223.
- (28) McCollum, E. V., Simmonds, N., and Parsons, H. T.: The etiology of rickets. *Proc. Am. Soc. Biol. Chem. Jour. Biol. Chem.*, 1920, 41, 31.
- (29) Mellanby, E.: Accessory food factors (vitamins) in the feeding of infants. *The Lancet*, 1920, I, 856-862.
- (30) Paton, D. N., and Watson, A.: Etiology of rickets. *Brit. Med. Jour.*, 1921, I 594.
- (31) McCollum, E. V., Simmonds, N., Becker, J. E., and Shipley, P. G.: Rickets—A vitamin which promotes calcium deposition. *Johns Hopkins Hospital Bulletin*, June, 1922 (33), p. 229.
- (32) Johnson, J. M., and Hooper, C. W.: Antineuritic vitamin in skim milk powder. *Public Health Reports*, Aug. 26, 1921, pp. 2037-2043. (Reprint No. 689.)

(33) Johnson, J. M.: The growth-promoting properties of milk and dried milk preparations. Public Health Reports, Aug. 26, 1921, pp. 2044-2057. (Reprint No. 690.)

(34) Johnson, J. M., and Hooper, C. W.: The comparative antiscorbutic values of milk. Public Health Reports, Apr. 28, 1922, pp. 989-1021. (Reprint No. 743.)

THE TANNIC ACID METHOD FOR QUANTITATIVE DETERMINATION OF CARBON MONOXIDE IN THE BLOOD.¹

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INTRODUCTION.

Carbon monoxide may occur in many places, and inhalation of that insidious gas is a frequent and widely distributed cause of poisoning, ranging in severity from headache and inefficiency to unconsciousness and death. People are continually being affected by carbon monoxide in the home, in garages, around gas and gasoline engines and blast furnaces, in fighting fires, after blasting in mines and quarries, and after mine fires and explosions; in fact, everywhere there is the possibility of an exposure to the products of combustion of carbonaceous fuels or products. On the other hand, there are many cases reported where ill effects and accidents are wrongly attributed to carbon monoxide. Therefore it is essential for doctors, coroners, safety engineers, and first-aid men to be able to recognize this poisoning, not only in order to give proper treatment and to determine the cause of death, but also to insure just decisions on claims and to eliminate illusions and complaints of workmen.

As the ordinary symptoms of carbon monoxide poisoning, such as headache, nausea, dizziness, collapse, and unconsciousness, can be caused by other things, and may also vary with the individual, there is no specific test for the degree of poisoning except an examination of the blood for carbon monoxide-hemoglobin (CO-Hb) content. To make this test from a purely qualitative consideration is comparatively easy, and a number of procedures have been devised. However, in view of the fact that the occurrence of symptoms is in proportion to the degree of poisoning, it is desirable not only to detect the presence of the CO-Hb, but also to determine the quantity. Heretofore the methods used to make this quantitative estimation have either required elaborate and expensive apparatus, or involved technique unsuited for conditions except those found in the laboratory. Owing to the fact that most of the cases of poisoning occur at places distant from laboratories making these examinations, and also to the obvious necessity of immediate results, there is a demand for a reliable method which can be used by any person likely to have

¹ Investigations carried on in cooperation with the United States Bureau of Mines.

contact with cases of carbon monoxide poisoning. A suitable method is outlined below.

DEVELOPMENT.

Following the procedure of Wetzel's² qualitative test, when normal blood, diluted 1:4 with water, and shaken with an equal volume of 1 per cent tannic acid, is allowed to stand for 24 hours, a gray suspension is formed, while blood containing CO-Hb remains a carmine red. This color reaction is quite sensitive and, when once formed, changes so slowly that the writers decided to adapt it to quantitative purposes.

From two specimens of blood—the one being ordinary venous blood and the other blood saturated with CO—solutions were made with distilled water (1:9), and using these, mixtures were prepared varying from none to 100 per cent CO-Hb (0, 10, 20, etc.). Equal volumes of these mixtures were then put in each of a series of test tubes and treated with tannic acid. When arranged in a rack and left standing for 10 hours the graduation of a color change with the amount of CO-Hb was quite evident. A sample of an "unknown" blood, prepared and conditioned similarly, could be readily matched with its corresponding standard.

The results of the preliminary work promised an accurate yet easy method for quantitative determination of CO in the blood, and it was decided to investigate it further in view of finding the best working conditions—that is, concentration of blood and acid, size of test tubes, and proper lighting conditions for making the comparison of unknowns to the standards. Later, the effects caused by the use of anticoagulants³ in preserving the blood to be used as material for standards, the storage of blood for standard material, the possibility of decreasing the time required for the formation of the color, and the permanency of the prepared standards were also investigated.

PROCEDURE FOR MAKING STANDARDS.

As the result of a rather extensive series of tests on the above conditions, the procedure finally adopted for making standards is as follows:

Using a modified Keidel tube (work cited) or any intravenous means, 5 c. c. or more of human blood is drawn and kept from clotting by the addition of 0.05 gram of potassium citrate ($K_3C_6H_5O_7$), or 0.02 gram sodium fluoride (NaF) (work cited) per 10 c. c. of whole blood (the advantages of each will be discussed later). The blood thus obtained is divided into approximately equal parts, one of which is immediately diluted 1 in 10 with distilled water, while the

² McNally, W. D.: Carbon monoxide poisoning. Jour. Am. Med. Assn., Nov. 10, 1917.

³ O'Brien, H. R., Jones, C. W., Allison, V. C.: Collection and preservation of blood samples for carbon monoxide determination. (Unpublished.) United States Bureau of Mines.

other is saturated with 3 to 5 per cent of CO gas, then diluted 1 in 10 with distilled water. The saturating of blood with CO should be done before diluting with distilled water, so as to minimize the volume of CO gas dissolved in the solution, because the physical solubility is thus limited to the plasma; whereas, if the saturation were made after dilution with water the volume of gas dissolved would have to be so increased, in order to insure saturation of the hemoglobin in the diluted solution of venous blood, that it would affect seriously the calculated relation.

From these solutions of approximately all oxy-hemoglobin (O_2Hb) and carbon monoxide-hemoglobin ($CO-Hb$), respectively, mixtures are made which total 1 c. c., but vary from none to 100 per cent $CO-Hb$ in steps of 10. These are contained in test tubes of approximately $\frac{5}{16}$ inch inside diameter, and of clear, thin, glass. To each standard thus prepared is added 1 c. c. of a mixture consisting of equal parts of a strictly fresh solution of 2 per cent pyrogalllic acid and a solution of 2 per cent tannic acid, after which the tube is inverted twice to insure thorough mixing. Immediately after adding the acid, the tube should be sealed by pouring a little melted paraffin on top of the contents, the tube being immersed in cold water as a caution against overheating. This temporary seal will be sufficient to exclude the air until the walls of the tubes have become dry, after which a tight, permanent seal can be made by placing a disk of cardboard on top of the paraffin and filling the remainder of the tube with ordinary sealing wax. Care should be taken to have no air inclosed between the disk and the paraffin, or between the disk and the sealing wax. Standards thus prepared develop their full color in from 10 to 15 minutes, and if properly sealed will remain in a suitable condition of permanency for several weeks.

TECHNIQUE OF DETERMINATION.

In making an estimation of the CO in the blood of a supposed victim of poisoning, the technique is, in principle, quite similar to that of making the standards. Measure into a test tube of the same size and glass as used for the standards, 1 c. c. of a 0.05 per cent solution of potassium citrate or 0.03 per cent solution of sodium fluoride, depending on the anticoagulant used in preparing the standards. Then, by the aid of a hemospast, make a small puncture wound in the tip of the sterilized finger of the subject, and, with a capillary pipette, draw up 0.1 c. c. of blood. Quickly discharge this into the solution in the test tube, and add 1 c. c. of the mixture of pyrogalllic and tannic acids as previously described. After inverting twice to mix the constituents thoroughly, and allowing to stand from 8 to 10 minutes, a comparison with the standards can be made and the percentage noted. It is very good practice to prepare a similar sample from an unexposed subject, thus in-

suring against spoiled reagents or change in standards. Any differences noted in this control should be considered in estimating other samples.

The comparison of unknowns with standards can be made in various ways. Our procedure is to hold the unknown in the hand together with a row of four or five standards, and move its position until it, by color comparison, fits between two of them, after which an estimation can be made on the basis of the value of the two standards; or comparison can be made in a test-tube rack having fixed positions for the standard and a space between each for the interposition of the unknowns. In the use of this latter, the unknown is again moved until a place is found where it is, say, a little more red than the 20 and a little less than the 30.

In making the comparison, the observer should stand with his back to the light, viewing the tubes by reflection, and should change the position of the tubes several times to note if any differences occur that are due merely to unequal lighting effect. Also, holding the tubes against a black background, such as a coat sleeve, seems to facilitate the observation.

ACCURACY OF METHODS.

The color graduation is so marked that the untrained observer can obtain sufficiently dependable results. At various times during some investigations on the effects of CO poisoning, untrained observers were asked to estimate unknowns at the same time as the writers; also the results obtained were in many instances compared with other methods. The following tables give typical analysis:

TABLE I.—*Readings of five observers.*

Per cent saturation as made up.	Per cent as read by observers.				
	1	2	3	4	5
75.....	80	70	70	75	75
65.....	60	60	60	60	60
35.....	35	40	40	35	40
15.....	20	10	15	20	15
5.....	5	5	10	10	5

TABLE II.—*Readings of three observers and variations from actual percentage.*

Per cent CO as made up.	Per cent read by observers.					
	1		2		3	
	Read- ing.	Vari- ation.	Read- ing.	Vari- ation.	Read- ing.	Vari- ation.
0.....	0	0	0	0	1	1
5.....	10	5	10	5	10	5
15.....	15	0	15	0	15	0
25.....	26	2	30	2	23	3
44.....	44	0	44	0	45	1
85.....	85	0	85	0	88	3

TABLE III.—*Comparison of tannic acid with spectrophotometric method.*

Time after leaving gas chamber (minutes).	Per cent saturation with CO.		Time after leaving gas chamber (minutes).	Per cent saturation with CO.	
	Spectrophotometer.	Tannic acid.		Spectrophotometer.	Tannic acid.
2.....	35.0	36.0	48.....	12.0	19.0
14.....	31.0	28.0	123.....	9.2	12.0
30.....	22.6	24.0	314.....	5.0	6.0

These results given in Table III were obtained after the subject (Sayers) had been exposed for 55 minutes to 16 parts of CO in 10,000 parts of air. It will be noted in the comparison of the two methods that with but one exception the variation is less than 3 per cent, which is negligible for practical work in the determination of CO in the blood.

TABLE IV.—*Comparison of the tannic acid with the spectrophotometric, carmine, and Van Slyke methods for the determination of CO in the blood.*

Method and observer.	Per cent saturation.	Average.	Method and observer.	Per cent saturation.	Average.
Spectrophotometer-1.....	70	71.5	Carmine-3.....	74	75
Do.....	73		Do.....	76	
Tannic acid-2.....	72		Van Slyke-4.....	70	

In this experiment, a dog weighing 15 pounds had been exposed to 63 parts of CO in 10,000 for 30 minutes, and, after being treated with 90 per cent O₂ and 10 per cent CO₂, died. The blood was obtained from the heart by puncture.

TABLE V.—*Comparison of tannic acid method with spectrophotometer and results calculated from alveolar air.*

Tannic-acid method.	Spectrophotometer.	Calculated from alveolar air.	Tannic-acid method.	Spectrophotometer.	Calculated from alveolar air.
20.....	18	18	10.....	8	14
11.....	14	12	22.....	18	23
10.....	11	7	18.....	16	14
7.....	11	9			

TABLE VI.—*Comparison of tannic acid method with the Van Slyke method for the determination of CO in specimens of blood which had been preserved for 12 days with NaF.*

Tannic acid.	Van Slyke.	Tannic acid.	Van Slyke.
35.....	40	20 ¹	23
35.....	35	30.....	34

¹ Blood clotted and slightly decomposed.

These results were obtained routinely and by different observers. It is evident that an occasional analysis by one man might be incorrect by 5 per cent, but the error is generally less.

DISCUSSION AND PRECAUTIONS OF THE PROCEDURE.

In view of the simplicity of the procedure, and the reliability of the results, this method should be well suited to the determination of CO poisoning. It can also be used to estimate the CO-Hb in samples which have been collected in the field and shipped to the laboratory; and its dependability for research problems has been illustrated in connection with some recent work, data from which are shown in Tables III, IV, V, and VI.

When using this method for the estimation of samples that were collected in the field, it is of importance to know what anticoagulant was used, and to have the standards made from a like preserved stock, otherwise there will be a difference of color. For immediate routine work, potassium citrate is better than sodium fluoride because it produces a lighter color in which it is much easier to detect the carmine red. On the other hand, where three days or more will elapse between the taking of the sample and its analysis, it would be well to use sodium fluoride, owing to its better preserving properties, even though it produces a darkening effect which masks the color. However, this estimation of field samples is secondary to the main use of the method, and for nearly all ordinary work, potassium citrate will be quite suitable.

Probably the most important item of the entire analysis is to have strictly fresh prepared solutions, especially the mixture of tannic and pyrogallic acids. In order to insure this, the scheme best suited is to have ampules prepared containing the acids in the solid form. When needed for use these can be broken, and the contents emptied into water in which the acid quickly dissolves and is ready for use. The potassium citrate solution does not deteriorate as quickly as the acid mixture, but will spoil in time, and it might also be good practice to prepare it fresh from ampules.

In order to avoid having to obtain fresh blood for standards, we are preparing a permanent set from pigments, and this promises to furnish what is ultimately expected of the method, namely, a standard which can easily be kept in readiness for use at all times and without any preliminary preparation.

SUMMARY.

We believe that the method described is particularly adapted to the requirements for determination of poisoning by CO gas. It can be used for either a quantitative estimation or, in the absence of a set of standards, as a qualitative test, the comparison in the latter being made with a single standard immediately prepared from 0.1 c. c. of

the blood of an unexposed subject (very conveniently the person making the test). As support for the foregoing statement, the following conclusions are offered:

1. The small quantity of blood needed can easily be obtained without objection on the part of the patient.
2. The solutions used are cheap, common, and easily made. The apparatus used is simple and inexpensive.
3. The actual time of making an analysis is not more than 3 minutes; and results can be obtained in 8 to 10 minutes.
4. The accuracy is well within the required limits.
5. No great skill or special training is necessary for securing good results.
6. The method automatically corrects for any dissociation of carbon monoxide-hemoglobin due to the dilution with water.
7. The results are more easily obtained, and are, as a whole, more dependable than with any other method tried.

REQUIREMENT THAT MILK SELLER SECURE PERMIT UPHELD.

An ordinance of St. Louis, Mo., requires that a permit from the board of public service be obtained by any person selling milk. In a prosecution¹ for violation of the ordinance, where the defendant was charged with conducting a dairy and selling milk therefrom without having a permit, the Supreme Court of Missouri held that the requirement necessitating a permit was a lawful one. In so deciding the court said:

It thus appears that the very purpose of the permit was to protect the public. It indicated to the purchasers that the municipality had determined that the holder of the permit could be relied upon for a wholesome quality of the article sold. It is like the license from the State board of health to a doctor. Such license bespeaks the qualifications of the holder, and thus protects the general public. The permits or licenses authorized by this ordinance perform the same function. They say to the general buying public, You will be safe in buying from this man (the holder of the permit) because he can be relied upon to furnish a wholesome article. And, further, the issuance of permits is but another method of registration of milk sellers. The city, in exercise of its police power, had the authority to require milk sellers to take out such permits.

DEATHS DURING WEEK ENDED SEPTEMBER 23, 1922.

Summary of information received by telegraph from industrial insurance companies for week ended September 23, 1922, and corresponding week 1921. (From the Weekly Health Index, September 26, 1922, issued by the Bureau of the Census, Department of Commerce.)

	Week ended Sept. 23, 1922.	Corresponding week 1921.
Policies in force.....	50, 614, 343	47, 083, 403
Number of death claims.....	7, 908	7, 482
Death claims per 1,000 policies in force, annual rate.....	8.1	8.3

¹ City of St. Louis v. Kellmann, 243 S. W. 134.

Deaths from all causes in certain large cities of the United States during the week ended September 23, 1922, infant mortality, annual death rate, and comparison with corresponding week of 1921. (From the Weekly Health Index, September 26, 1922, issued by the Bureau of the Census, Department of Commerce.)

City.	Estimated population July 1, 1922.	Week ended Sept. 23, 1922.		Annual death rate per 1,000, corresponding week 1921.	Deaths under 1 year.		Infant mortality rate, week ended Sept. 23, 1922. ³
		Total deaths.	Death rate. ¹		Week ended Sept. 23, 1922.	Corresponding week 1921.	
Total.....	27,927,877	5,445	10.2	10.3	877	933	.....
Akron, Ohio.....	² 208,435	31	7.8	4.8	6	5	64
Albany, N. Y.....	116,223	29	13.0	10.0	4	6	90
Atlanta, Ga.....	220,047	42	10.0	14.3	5	9	.....
Baltimore, Md.....	762,222	176	12.0	12.9	37	30	104
Birmingham, Ala.....	191,017	44	12.0	13.2	8	12	.....
Boston, Mass.....	764,017	197	13.4	13.1	38	26	102
Bridgeport, Conn.....	³ 143,555	21	7.6	7.6	4	3	50
Buffalo, N. Y.....	528,163	123	12.1	10.7	25	33	98
Cambridge, Mass.....	110,944	25	11.8	11.3	3	5	55
Camden, N. J.....	121,915	14	6.0	9.6	5	5	76
Chicago, Ill.....	2 833,288	537	9.9	10.0	99	106	.....
Cincinnati, Ohio.....	404,865	85	10.9	12.5	15	13	100
Cleveland, Ohio.....	854,003	167	10.2	7.8	37	26	95
Columbus, Ohio.....	253,455	63	13.0	8.9	10	13	106
Dallas, Tex.....	171,974	28	8.5	9.5	4	7	.....
Dayton, Ohio.....	161,824	36	11.6	11.2	4	6	68
Denver, Colo.....	267,591	73	14.2	11.5	12	10	.....
Detroit, Mich.....	³ 963,678	186	9.8	8.6	37	55	71
Fall River, Mass.....	120,790	32	13.8	13.4	10	8	140
Fort Worth, Tex.....	114,717	16	7.3	.....	2	.....	.....
Grand Rapids, Mich.....	143,572	18	6.5	9.2	2	3	33
Houston, Tex.....	150,087	31	10.8	10.1	8	3	.....
Indianapolis, Ind.....	333,257	76	11.9	13.1	7	8	53
Jersey City, N. J.....	305,911	50	8.5	9.5	7	11	45
Kansas City, Mo.....	343,988	81	12.3	12.7	19	7	.....
Los Angeles, Calif.....	634,866	153	12.6	12.8	17	16	71
Louisville, Ky.....	236,877	41	9.0	14.1	7	11	76
Lowell, Mass.....	114,423	26	11.8	7.3	8	3	135
Memphis, Tenn.....	167,862	51	15.8	17.3	11	6	.....
Milwaukee, Wis.....	476,603	68	7.4	8.8	9	24	44
Minneapolis, Minn.....	400,970	69	9.0	11.5	10	9	55
Nashville, Tenn.....	122,832	30	12.7	15.0	3	5	.....
New Bedford, Mass.....	127,542	31	12.7	12.1	4	10	59
New Haven, Conn.....	169,987	33	10.1	10.6	7	4	86
New Orleans, La.....	399,616	121	15.8	14.5	10	14	.....
New York, N. Y.....	5,839,746	960	8.6	8.7	153	180	59
Newark, N. J.....	431,792	81	9.8	10.4	10	20	44
Norfolk, Va.....	124,915	24	10.0	13.8	3	4	53
Oakland, Calif.....	233,279	39	8.7	9.4	4	4	50
Omaha, Nebr.....	200,739	40	10.4	13.8	4	4	43
Paterson, N. J.....	138,521	21	7.9	12.9	3	5	46
Philadelphia, Pa.....	1,894,500	356	9.8	10.5	65	57	77
Pittsburgh, Pa.....	607,902	138	11.8	10.7	21	26	67
Portland, Oreg.....	269,240	53	10.3	9.6	6	3	59
Providence, R. I.....	241,011	59	12.8	12.4	6	11	47
Richmond, Va.....	178,365	35	10.2	12.2	7	3	85
Rochester, N. Y.....	311,548	49	8.2	6.7	5	8	38
St. Louis, Mo.....	795,008	139	9.1	9.8	10	12	.....
St. Paul, Minn.....	239,836	40	8.7	10.7	2	3	19
Salt Lake City, Utah.....	123,918	26	10.9	11.1	3	3	45
San Antonio, Tex.....	178,056	45	13.2	.....	9	.....	.....
San Francisco, Calif.....	529,792	118	11.6	12.1	6	10	35
Seattle, Wash.....	³ 315,312	57	9.4	8.0	6	7	51
Spokane, Wash.....	104,445	25	12.5	10.0	3	4	64
Springfield, Mass.....	149,632	35	13.0	13.0	4	9	60
Syracuse, N. Y.....	181,012	40	11.5	13.8	6	5	72
Toledo, Ohio.....	260,717	48	9.6	8.4	3	9	29
Trenton, N. J.....	125,075	36	15.0	10.6	10	0	153
Washington, D. C.....	³ 437,571	93	11.1	10.6	16	13	92
Wilmington, Del.....	115,568	18	8.1	8.7	3	5	58
Worcester, Mass.....	188,449	30	8.3	9.0	8	5	87
Yonkers, N. Y.....	105,422	7	3.5	8.6	1	2	21
Youngstown, Ohio.....	144,970	29	10.4	9.7	6	9	79

¹ Annual rate per 1,000 population.

² Deaths under 1 year per 1,000 births—an annual rate based on deaths under 1 year for the week and estimated births for 1921. Cities left blank are not in the registration area for births.

³ Enumerated population Jan. 1, 1920.

PREVALENCE OF DISEASE.

No health department, State or local, can effectively prevent or control disease without knowledge of when; where, and under what conditions cases are occurring.

UNITED STATES.

CURRENT STATE SUMMARIES.

Telegraphic Reports for Week Ended September 30, 1922.

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers.

ARKANSAS.		GEORGIA.	
	Cases.		Cases.
Chicken pox.....	1	Chicken pox.....	3
Diphtheria.....	26	Dengue.....	726
Influenza.....	4	Diphtheria.....	52
Malaria.....	112	Hookworm disease.....	3
Measles.....	1	Influenza.....	24
Ophthalmia neonatorum.....	1	Malaria.....	90
Pellagra.....	5	Measles.....	1
Scarlet fever.....	7	Pneumonia.....	7
Smallpox.....	2	Scarlet fever.....	20
Trachoma.....	1	Tetanus.....	1
Tuberculosis.....	27	Trachoma.....	1
Typhoid fever.....	10	Tuberculosis (pulmonary).....	7
Whooping cough.....	5	Typhoid fever.....	26
		Typhus fever.....	1
		Whooping cough.....	18
COLORADO.		ILLINOIS.	
(Exclusive of Denver.)			
Chicken pox.....	1	Cerebrospinal meningitis:	
Diphtheria.....	23	Chicago.....	2
Measles.....	1	Lake County.....	1
Polioomyelitis.....	1	Marion County.....	1
Rocky Mountain spotted or tick fever.....	1	St. Clair County.....	1
Scarlet fever.....	16	White County.....	1
Septic sore throat.....	1	Diphtheria:	
Smallpox.....	1	Cook County (including Chicago).....	137
Tuberculosis.....	28	Chicago.....	113
Typhoid fever.....	28	Henderson County.....	9
		Madison County.....	20
		Saline County.....	12
		Scattering.....	157
		Influenza.....	24
		Pneumonia.....	196
		Polioomyelitis:	
		Cook County.....	4
		Chicago.....	3
		Hardin County.....	1
FLORIDA.			
Dengue.....	428		
Diphtheria.....	20		
Influenza.....	33		
Malaria.....	25		
Pneumonia.....	3		
Scarlet fever.....	2		
Smallpox.....	1		
Typhoid fever.....	6		

ILLINOIS—continued.

Poliomyelitis—Continued.	Cases.
St. Clair County.....	1
Williamson County.....	1
Scarlet fever:	
Cook County (including Chicago).....	57
Chicago.....	44
Peoria County.....	21
Scattering.....	84
Smallpox.....	1
Typhoid fever.....	52
Whooping cough.....	150

IOWA.

Diphtheria.....	66
Scarlet fever.....	39
Typhoid fever.....	2

KANSAS.

Chicken pox.....	4
Diphtheria.....	131
German measles.....	2
Influenza.....	1
Measles.....	7
Mumps.....	4
Pneumonia.....	11
Poliomyelitis.....	1
Scarlet fever.....	68
Smallpox.....	3
Trachoma.....	2
Tuberculosis.....	63
Typhoid fever.....	38
Whooping cough.....	9

LOUISIANA.

Dengue.....	567
Diphtheria.....	23
Influenza.....	10
Malaria.....	44
Poliomyelitis.....	1
Scarlet fever.....	3
Smallpox.....	3
Typhoid fever.....	25
Whooping cough.....	4

MARYLAND.¹

Cerebrospinal meningitis.....	1
Chicken pox.....	3
Diphtheria.....	58
Dysentery.....	6
German measles.....	1
Influenza.....	6
Malaria.....	7
Measles.....	7
Mumps.....	5
Paratyphoid fever.....	2
Pneumonia (all forms).....	31
Poliomyelitis.....	1
Scarlet fever.....	27
Tetanus.....	1
Trachoma.....	1
Tuberculosis.....	50
Typhoid fever.....	64
Whooping cough.....	32

¹ Week ended Friday.

MASSACHUSETTS.

	Cases.
Chicken pox.....	8
Conjunctivitis (suppurative).....	9
Diphtheria.....	189
German measles.....	3
Influenza.....	4
Leprosy.....	1
Lethargic encephalitis.....	2
Malaria.....	4
Measles.....	101
Mumps.....	12
Ophthalmia neonatorum.....	18
Pneumonia (lobar).....	24
Poliomyelitis.....	17
Scarlet fever.....	97
Septic sore throat.....	1
Tetanus.....	1
Trachoma.....	2
Tuberculosis (all forms).....	119
Typhoid fever.....	32
Whooping cough.....	182

MONTANA.

Diphtheria.....	8
Poliomyelitis.....	1
Scarlet fever.....	5
Smallpox.....	9
Typhoid fever.....	9

NEBRASKA.

Diphtheria:	
Omaha.....	16
Scattering.....	7
German measles.....	1
Influenza.....	1
Measles.....	1
Mumps.....	1
Poliomyelitis—McCook.....	1
Scarlet fever.....	21
Tuberculosis.....	1
Typhoid fever.....	4
Whooping cough.....	5

NEW JERSEY.

Cerebrospinal meningitis.....	3
Chicken pox.....	10
Diphtheria.....	163
Dysentery.....	2
Influenza.....	7
Malaria.....	2
Measles.....	54
Paratyphoid fever.....	1
Pneumonia.....	38
Poliomyelitis.....	5
Scarlet fever.....	57
Trachoma.....	2
Typhoid fever.....	27
Whooping cough.....	104

NEW MEXICO.

Chicken pox.....	1
Diphtheria.....	24
German measles.....	1
Influenza.....	2

NEW MEXICO—continued.

	Cases.
Pneumonia.....	1
Scarlet fever.....	3
Tuberculosis.....	11
Typhoid fever:	
Albuquerque.....	14
Scattering.....	12

NEW YORK.

(Exclusive of New York City.)

Diphtheria.....	160
Influenza.....	5
Measles.....	27
Pneumonia.....	58
Poliomyelitis.....	49
Scarlet fever.....	139
Smallpox.....	5
Typhoid fever.....	29
Whooping cough.....	151

NORTH CAROLINA.

Cerebrospinal meningitis.....	2
Chicken pox.....	6
Diphtheria.....	455
German measles.....	2
Lethargic encephalitis.....	1
Measles.....	7
Poliomyelitis.....	3
Scarlet fever.....	124
Septic sore throat.....	6
Smallpox.....	4
Typhoid fever.....	42
Whooping cough.....	60

OREGON.

Chicken pox.....	1
Diphtheria—Portland.....	10
Measles.....	3
Pneumonia.....	11
Scarlet fever.....	5
Smallpox.....	8
Tuberculosis.....	14
Typhoid fever.....	5
Whooping cough.....	8

SOUTH DAKOTA.

Diphtheria.....	7
Poliomyelitis.....	1
Scarlet fever.....	41
Smallpox.....	6
Tetanus.....	1
Tuberculosis.....	3

1 Death.

SOUTH DAKOTA—continued.

	Cases.
Typhoid fever.....	8
Whooping cough.....	7

TEXAS.

Dengue.....	493
Diphtheria.....	17
Influenza.....	3
Pneumonia.....	4
Scarlet fever.....	9
Smallpox.....	10

VERMONT.

Chicken pox.....	19
Diphtheria.....	21
Poliomyelitis.....	1
Scarlet fever.....	16
Whooping cough.....	9

WASHINGTON.

Chicken pox.....	11
Diphtheria.....	17
Measles.....	
Mumps.....	19
Scarlet fever.....	9
Smallpox.....	15
Tuberculosis.....	29
Typhoid fever.....	8
Whooping cough.....	24

WISCONSIN.

Milwaukee:	
Chicken pox.....	6
Diphtheria.....	18
German measles.....	1
Measles.....	43
Pneumonia.....	3
Scarlet fever.....	18
Tuberculosis.....	11
Typhoid fever.....	2
Whooping cough.....	18

Scattering:

Chicken pox.....	4
Diphtheria.....	53
Influenza.....	5
Lethargic encephalitis.....	1
Measles.....	13
Pneumonia.....	2
Poliomyelitis.....	2
Scarlet fever.....	53
Smallpox.....	16
Trachoma.....	1
Tuberculosis.....	40
Typhoid fever.....	11
Whooping cough.....	38

Delayed Reports for Week Ended September 23, 1922.

ALABAMA.		INDIANA.	
	Cases.		Cases.
Cerebrospinal meningitis.....	1	Diphtheria.....	101
Dengue.....	2	Rabies in animals—Marion County.....	1
Diphtheria.....	64	Scarlet fever.....	53
Hookworm disease.....	10	Smallpox.....	3
Influenza.....	53	Typhoid fever.....	19
Malaria.....	30		
Ophthalmia neonatorum.....	1		
Pellagra.....	1		
Polioomyelitis.....	2		
Scarlet fever.....	28		
Tuberculosis.....	18		
Typhoid fever.....	22		
CALIFORNIA.		KENTUCKY.	
Cerebrospinal meningitis:		Cerebrospinal meningitis:	
Los Angeles.....	1	Livingston County.....	1
Pasadena.....	1	Chicken pox.....	1
Diphtheria.....	128	Diphtheria:	
Influenza.....	13	Anderson County.....	9
Jaundice—Hanford.....	1	Jefferson County.....	19
Leprosy—San Francisco.....	1	Scattering.....	46
Measles.....	3	Dysentery.....	1
Polioomyelitis:		Lethargic encephalitis:	
Los Angeles.....	1	Jefferson County.....	1
Los Angeles County.....	2	Mumps.....	1
Scarlet fever.....	62	Pellagra.....	1
Smallpox.....	7	Pneumonia.....	8
Typhoid fever.....	33	Scarlet fever.....	17
		Smallpox.....	4
		Trachoma.....	25
		Tuberculosis:	
		Davless County.....	1
		Jefferson County.....	26
		Typhoid fever:	
		Jefferson County.....	12
		Scattering.....	27
		Whooping cough.....	8
CONNECTICUT.		MAINE.	
Cerebrospinal meningitis.....	1	Chicken pox.....	2
Chicken pox.....	26	Diphtheria.....	10
Conjunctivitis (infectious).....	1	Influenza.....	5
Diphtheria.....	54	Measles.....	1
Influenza.....	3	Pneumonia.....	1
Malaria.....	5	Polioomyelitis.....	1
Measles.....	13	Scarlet fever.....	10
Mumps.....	3	Tuberculosis.....	3
Pneumonia (lobar).....	4	Typhoid fever.....	4
Polioomyelitis.....	1	Whooping cough.....	2
Scarlet fever.....	40		
Tuberculosis (all forms).....	26		
Typhoid fever.....	11		
Whooping cough.....	48		
DELAWARE.		MINNESOTA.	
Chicken pox.....	1	Chicken pox.....	2
Ophthalmia neonatorum.....	1	Diphtheria.....	91
Scarlet fever.....	5	Measles.....	4
Tuberculosis.....	4	Pneumonia.....	5
Typhoid fever.....	11	Polioomyelitis.....	1
		Scarlet fever.....	101
		Smallpox.....	13
		Tuberculosis.....	107
		Typhoid fever.....	17
		Whooping cough.....	5
DISTRICT OF COLUMBIA.		MISSISSIPPI.	
Chicken pox.....	5	Diphtheria.....	78
Diphtheria.....	8	Scarlet fever.....	14
Measles.....	2	Smallpox.....	2
Tuberculosis.....	36	Typhoid fever.....	28
Typhoid fever.....	7		
Whooping cough.....	12		

Delayed Reports for Week Ended September 23, 1922—Continued.

MISSOURI.		SOUTH DAKOTA.	
	Cases.		Cases.
Cerebrospinal meningitis.....	1	Cerebrospinal meningitis.....	1
Diphtheria.....	67	Chicken pox.....	1
Epidemic sore throat.....	6	Diphtheria.....	2
Measles.....	1	Poliomyelitis.....	1
Mumps.....	1	Scarlet fever.....	11
Ophthalmia neonatorum.....	1	Smallpox.....	3
Pneumonia.....	8	Tuberculosis.....	2
Rabies.....	1		
Scarlet fever.....	31	WYOMING.	
Smallpox.....	3	Diphtheria.....	2
Tetanus.....	1	Pneumonia.....	1
Trachoma.....	125	Poliomyelitis—Goshen County.....	5
Tuberculosis.....	12	Scarlet fever:	
Typhoid fever.....	12	Campbell County.....	8
Whooping cough.....	21	Converse County.....	2
		Tuberculosis.....	1
		Typhoid fever.....	6

SUMMARY OF CASES REPORTED MONTHLY BY STATES.

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State.	Cerebrospinal meningitis.	Diphtheria.	Influenza.	Malaria.	Measles.	Fellagra.	Poliomyelitis.	Scarlet fever.	Smallpox.	Typhoid fever.
JUNE, 1922.										
Michigan.....		401	2	1	1,484		3	453	88	67
JULY, 1922.										
Alabama.....		82	19	133	6	28	10	31	17	180
Vermont.....	1	17			46		1	29		2
AUGUST, 1922.										
Alabama.....		252	20	196	3	24	2	59	11	294
California.....		511	31	42	43	1	9	109	113	132
Colorado.....	2	198	1		5		3	50	17	85
Hawaii.....	2	14	7		34					21
Iowa.....	3	65			2		1	48		16
Kansas.....	5	166	1	6	15		6	194	5	158
Maine.....	2	46			11		2	18	1	42
Michigan.....		327	9	7	99		6	313	24	97
Mississippi.....	1	262	145	19,563	48	504		39	10	318
North Dakota.....		36						37	24	12
Ohio.....	4	445	7	6	241		4	426	35	340
Oklahoma.....		29		12	1	1	7	12	1	116
Oregon.....		26			6			9	32	27
South Dakota.....		22			13			45	6	13
Virginia.....	6	498	465	457	78	28	13	168	8	363
Washington.....		55			9		1	37	32	52

SUMMARY OF CASES REPORTED MONTHLY BY STATES—Continued.

Cases of Certain Communicable Diseases Reported for the Month of July, 1922,
by State Health Officers.

State.	Number of cases reported.								
	Chicken pox.	Diph- theria.	Measles.	Mumps.	Scarlet fever.	Small- pox.	Tuber- culosis.	Typhoid fever.	Whoop- ing cough.
Alabama.....	6	82	6	6	31	17	55	180	11
Arizona ¹									
Arkansas.....	12	8	12		11	3	74	83	80
California.....	167	421	47	64	159	93	712	137	327
Colorado.....	59	106	8	36	54	14	220	73	133
Connecticut.....	26	111	494	24	80	11	146	64	197
Delaware.....	8	10	4	1	12		14	23	
District of Columbia.....	17	26	65		7		109	23	35
Florida.....	3	51	1	4	10	8	79	37	9
Georgia ¹									
Idaho.....	7	17			16	6	6	13	2
Illinois.....	248	576	1,182	98	240	175	1,464	182	1,145
Indiana.....		117	190		74	68	142	61	
Iowa.....		51	4		70	12		(²)	
Kansas.....	25	93	29	28	140	29	165	108	207
Kentucky ¹									
Louisiana.....		51	6		19	128	255	123	15
Maine.....	52	39	54	4	70	9	43	60	36
Maryland.....	37	92	396	103	50		238	124	199
Massachusetts.....	136	382	1,275	184	226		575	75	413
Michigan.....	140	321	519	39	353	49	217	69	754
Minnesota.....	47	171	143		247	102	276	44	96
Mississippi.....	230	130	22	52	28	8	242	425	759
Missouri ¹									
Montana ¹									
Nebraska.....	15	35	25	12	32	14	25	12	26
Nevada.....									
New Hampshire.....									
New Jersey.....	92	348	898		206	1	506	84	570
New Mexico.....	4	83			6	1	101	25	3
New York.....	432	1,048	2,949	460	618	3	1,989	221	1,205
North Carolina.....	54	357	107		123	47		560	797
North Dakota.....	1	27			18	18	4	2	8
Ohio.....	158	455	1,167	38	321	61	622	277	1,121
Oklahoma.....		8		4	7	6	4	79	
Oregon.....	24	52	9	7	10	40	40	15	17
Pennsylvania.....	306	762	2,757	179	434	1	608	273	1,042
Rhode Island.....	3	41	39	5	21		68	4	40
South Carolina.....	3	111	1	1	13	14	8	119	28
South Dakota.....	11	16	7		46	15	17	10	17
Tennessee.....									
Texas ¹									
Utah.....									
Vermont.....	40	17	46	15	29	0	23	2	60
Virginia.....	78	220	358		83	7	300	400	
Washington.....	111	53	28	71	41	46	90	49	131
West Virginia.....	26	117	46		70	38	58	156	79
Wisconsin.....	174	154	446		186	117	190	29	1,543
Wyoming ¹									

¹ Report for July not received.² Reports received weekly.³ Not notifiable.⁴ 114 of these cases occurred prior to July

SUMMARY OF CASES REPORTED MONTHLY BY STATES—Continued.

Reported Cases per 1,000 Population (Annual Basis) for the Month of July, 1922.

State.	Case rates per 1,000 population.								
	Chicken pox.	Diph- theria.	Measles.	Mumps.	Scarlet fever.	Small- pox.	Tuber- culosis.	Typhoid fever.	Whoop- ing cough.
Alabama.....	0.03	0.40	0.03	0.03	0.15	0.08	0.27	0.88	0.05
Arizona ¹									
Arkansas.....	.08	.05	.08		.07	.02	.48	.54	.52
California.....	.53	1.34	.15	.20	.51	.30	2.27	.44	1.04
Colorado.....	.71	1.28	.10	.43	.65	.17	2.65	.88	1.60
Connecticut.....	.21	.90	4.01	.20	.65	.09	1.19	.52	1.60
Delaware.....	.41	.52	.21	.05	.62		.72	1.19	
District of Columbia.....	.43	.06	1.65		.18		2.76	.58	.89
Florida.....	.03	.59	.01	.05	.11	.09	.91	.43	.10
Georgia ²									
Idaho.....	.18	.44			.41	.15	.15	.33	.05
Illinois.....	.44	1.01	2.08	.17	.42	.31	2.57	.32	2.01
Indiana.....		.46	.75		.29	.27	.56	.24	
Iowa.....		.25	.02		.34	.06		(³)	
Kansas.....	.16	.61	.19	.18	.92	.19	1.09	.71	1.36
Kentucky ²									
Louisiana.....			.04		.12	.82	1.64	.79	.10
Maine.....	.79	.59	.82	.03	1.06	.14	.65	.91	.55
Maryland.....	.29	.73	3.13	.81	.40		1.88	.98	1.57
Massachusetts.....	.40	1.13	3.77	.54	.67		1.70	.22	1.22
Michigan.....	.42	.97	1.57	.12	1.07	.15	.66	.21	2.28
Minnesota.....	.22	.82	.68		1.18	.49	1.32	.21	.46
Mississippi.....	1.51	.85	.14	.34	.18	.05	1.59	2.79	4.99
Missouri ²									
Montana ¹									
Nebraska.....	.13	.31	.22	.11	.28	.12	.22	.11	.23
Nevada.....									
New Hampshire.....									
New Jersey.....	.33	1.24	3.19		.73	.00	1.80	.30	2.02
New Mexico.....	.13	2.65			.19	.03	3.22	.80	.10
New York.....	.47	1.15	3.24	.51	.68	.00	2.19	.24	1.32
North Carolina.....	.24	1.59	.48		.55	.21		2.49	3.54
North Dakota.....	.02	.48			.32	.32	.07	.04	.14
Ohio.....	.31	.89	2.28	.07	.63	.12	1.22	.54	2.19
Oklahoma.....		.04		.02	.04	.03	.02	.44	
Oregon.....	.35	.75	.13	.10	.15	.58	.58	.22	.25
Pennsylvania.....	.40	1.00	3.61	.23	.57	.00	.80	.36	1.36
Rhode Island.....	.05	.78	.74	.09	.40		1.29	.08	.76
South Carolina.....	.02	.76	.01	.01	.09	.10	.05	.81	.19
South Dakota.....	.20	.29	.13		.83	.27	.31	.18	.31
Tennessee.....									
Texas ²									
Utah.....									
Vermont.....	1.34	.57	1.54	.50	.97		.77	.07	2.01
Virginia.....	.39	1.09	1.78		.41	.03	1.49	1.98	
Washington.....	.93	.44	.23	.50	.34	.38	.75	.41	1.09
West Virginia.....	.20	.90	.35		.54	.29	.45	1.20	.61
Wisconsin.....	.76	.67	1.94		.81	.51	.83	.13	6.71
Wyoming ¹									

¹ Report for July not received.² Reports received weekly.³ Not notifiable.⁴ 114 cases of smallpox occurred prior to July.

DENGUE.

Macon, Ga.

Under date of September 23, 1922, several hundred cases of dengue were reported present at Macon, Ga.

CITY REPORTS FOR WEEK ENDED SEPTEMBER 16, 1922.

ANTHRAX.

City.	Cases.	Deaths.
Pennsylvania:		
Philadelphia.....	1	.....
West Virginia:		
Wheeling.....	1	.....

CEREBROSPINAL MENINGITIS.

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1921, inclusive. In instances in which data for the full seven years are incomplete, the median is that for the number of years for which information is available.

City.	Median for previous years.	Week ended Sept. 16, 1922.		City.	Median for previous years.	Week ended Sept. 16, 1922.	
		Cases.	Deaths.			Cases.	Deaths.
Alabama:				New York:			
Mobile.....	0	1	1	New York.....	4	7	.....
Connecticut:				Syracuse.....	0	.....	1
New Britain.....	0	1	.....	Pennsylvania:			
Indiana:				Philadelphia.....	1	.....	1
Gary.....	0	1	.....	Rhode Island:			
Kansas:				Pawtucket.....	0	1	.....
Wichita.....	0	1	.....	West Virginia:			
Minnesota:				Bluefield.....	0	.....	1
St. Paul.....	0	1	.....	Clarksburg.....	.....	.....	1
New Jersey:							
Newark.....	0	1	.....			

DENGUE.

City.	Cases.	Deaths.
Florida:		
Tampa.....	12	.....

DIPHTHERIA.

See p. 2454; also Telegraphic reports from States, p. 2441, and Monthly summaries, by States, p. 2445.

INFLUENZA.

City.	Cases.		Deaths, week ended Sept. 16, 1922.	City.	Cases.		Deaths, week ended Sept. 16, 1922.
	Week ended Sept. 17, 1921.	Week ended Sept. 16, 1922.			Week ended Sept. 17, 1921.	Week ended Sept. 16, 1922.	
California:				Michigan:			
Los Angeles.....	.....	3	.....	Detroit.....	3	1	.....
San Francisco.....	.....	2	1	Hamtramck.....	1	.....	.....
Santa Ana.....	.....	.....	1	Minnesota:			
Connecticut:				Minneapolis.....	.....	.....	1
Hartford.....	.....	1	.....	New Jersey:			
Meriden.....	1	.....	.....	East Orange.....	1	1	.....
Florida:				Newark.....	.....	3	.....
Tampa.....	.....	2	1	New York:			
Georgia:				Albany.....	1	.....	1
Atlanta.....	.....	.....	1	New York.....	11	7	1
Valdosta.....	.....	6	.....	Rochester.....	.....	.....	1
Illinois:				Schenectady.....	.....	1	1
Chicago.....	1	.....	.....	North Carolina:			
Danville.....	.....	2	.....	Wilmington.....	.....	.....	1
Kewanee.....	1	.....	.....	Pennsylvania:			
Indiana:				Philadelphia.....	.....	1	1
Mishawaka.....	.....	.....	1	Texas:			
Louisiana:				Fort Worth.....	.....	1	1
New Orleans.....	.....	6	1	Houston.....	.....	80	.....
Maryland:				Vermont:			
Baltimore.....	.....	6	.....	Rutland.....	.....	1	.....
Massachusetts:							
Amesbury.....	.....	1	.....			
Chelsea.....	.....	1	.....			
Somerville.....	1	.....	.....		

CITY REPORTS FOR WEEK ENDED SEPTEMBER 16, 1922—Continued.

LETHARGIC ENCEPHALITIS.

City.	Cases.	Deaths.	City.	Cases.	Deaths.
Nebraska: Omaha.....	1	1	Wisconsin: Eau Claire.....	1	

MALARIA.

Alabama: Birmingham.....	1		Massachusetts: Newburyport.....	1	
Montgomery.....	2		Michigan: Muskegon.....	1	
California: Los Angeles.....	2		Saginaw.....	1	
Sacramento.....	1		New Jersey: East Orange.....	1	
Connecticut: Hartford.....	1		New York: New York.....	2	
New Britain.....	1		Ohio: Cleveland.....	1	
Florida: Tampa.....	2	1	Pennsylvania: Philadelphia.....	1	
Georgia: Albany.....	3		Tennessee: Memphis.....	14	
Brunswick.....	1		Texas: Dallas.....	3	
Macon.....	12		Virginia: Richmond.....	1	2
Savannah.....	2				
Valdosta.....	4				
Illinois: Alton.....	1				
Maryland: Baltimore.....	1				

MEASLES.

See p. 2454; also Telegraphic weekly reports from States, p. 2441, and Monthly summaries by States, p. 2445.

PELLAGRA.

City.	Cases.	Deaths.	City.	Cases.	Deaths.
California: San Francisco.....	1		North Carolina: Raleigh.....		1
Georgia: Atlanta.....	1	1	Wilmington.....		1
Augusta.....	1	1	South Carolina: Charleston.....		4
Savannah.....	1	1	Tennessee: Memphis.....	1	
Louisiana: New Orleans.....	1	1			
Massachusetts: Boston.....	2				

PNEUMONIA (ALL FORMS).

Alabama: Birmingham.....		1	Florida: Tampa.....		1
Arizona: Tucson.....		1	Georgia: Atlanta.....		5
California: Glendale.....		1	Augusta.....		1
Long Beach.....		3	Macon.....	12	
Los Angeles.....	16	6	Illinois: Chicago.....		31
Oakland.....	2	1	Cicero.....		1
Richmond.....		1	Danville.....		1
Sacramento.....	1		Evanston.....	1	
San Francisco.....	13	10	Oak Park.....	1	
Stockton.....		1	Pecora.....		1
Vallejo.....		1	Springfield.....		2
Colorado: Denver.....		3	Indiana: Fort Wayne.....		1
Connecticut: Bridgeport.....		2	Indianapolis.....		4
Milford.....		1	Muncie.....		1
New Haven.....		4	Terre Haute.....		1
District of Columbia: Washington.....		3	Iowa: Council Bluffs.....		1

CITY REPORTS FOR WEEK ENDED SEPTEMBER 16, 1922—Continued.

PNEUMONIA (ALL FORMS)—Continued.

City.	Cases.	Deaths.	City.	Cases.	Deaths.
Kansas:			New Jersey—Continued.		
Kansas City.....	4	.....	Plainfield.....	.....	1
Topeka.....	4	.....	Trenton.....	1	.....
Kentucky:			West Orange.....	1	.....
Louisville.....	.....	5	New York:		
Louisiana:			Albany.....	2	.....
New Orleans.....	5	4	Buffalo.....	8	3
Maine:			Cohoes.....	1	.....
Auburn.....	.....	1	Jamestown.....	2	1
Portland.....	1	.....	Middletown.....	.....	1
Maryland:			New York.....	101	60
Baltimore.....	.....	12	Niagara Falls.....	.....	1
Massachusetts:			Olean.....	1	1
Boston.....	.....	6	Port Chester.....	.....	1
Chelsea.....	2	1	Rochester.....	6	.....
Fall River.....	1	.....	Syracuse.....	3	.....
Framingham.....	.....	1	Troy.....	2	1
Haverhill.....	2	.....	White Plains.....	1	.....
Holyoke.....	2	1	Yonkers.....	.....	2
Lawrence.....	.....	1	North Carolina:		
Lynn.....	.....	1	Raleigh.....	.....	1
Melrose.....	3	1	Ohio:		
Somerville.....	.....	1	Canton.....	.....	1
Springfield.....	1	.....	Cincinnati.....	.....	2
Woburn.....	.....	1	Cleveland.....	11	7
Michigan:			Dayton.....	1	.....
Benton Harbor.....	1	.....	Lima.....	.....	1
Detroit.....	13	9	Mansfield.....	3	.....
Flint.....	.....	1	Newark.....	.....	1
Grand Rapids.....	3	1	Toledo.....	.....	3
Highland Park.....	1	.....	Oregon:		
Kalamazoo.....	2	1	Portland.....	.....	1
Minnesota:			Pennsylvania:		
Duluth.....	2	1	Philadelphia.....	31	20
Minneapolis.....	.....	4	Rhode Island:		
St. Paul.....	.....	7	Providence.....	.....	1
Missouri:			South Carolina:		
Kansas City.....	5	4	Charleston.....	.....	1
Montana:			Tennessee:		
Butte.....	.....	1	Memphis.....	.....	3
Missoula.....	.....	1	Nashville.....	.....	2
Nebraska:			Texas:		
Lincoln.....	.....	2	Dallas.....	2	.....
Omaha.....	.....	2	Fort Worth.....	.....	1
Nevada:			Houston.....	.....	3
Reno.....	.....	1	Waco.....	.....	1
New Jersey:			Vermont:		
Atlantic City.....	1	.....	Rutland.....	1	.....
Belleville.....	1	.....	Virginia:		
Bloomfield.....	2	.....	Alexandria.....	1	.....
East Orange.....	.....	3	Portsmouth.....	.....	3
Elizabeth.....	.....	2	Richmond.....	.....	6
Englewood.....	.....	1	West Virginia:		
Jersey City.....	1	.....	Wheeling.....	.....	1
Morristown.....	.....	.....	Wisconsin:		
Newark.....	20	5	Racine.....	.....	1

CITY REPORTS FOR WEEK ENDED SEPTEMBER 16, 1922—Continued.

POLIOMYELITIS (INFANTILE PARALYSIS).

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1921, inclusive. In instances in which data for the full seven years are incomplete, the median is that for the number of years for which information is available.

City.	Median for previous years.	Week ended Sept. 16, 1922.		City.	Median for previous years.	Week ended Sept. 16, 1922.	
		Cases.	Deaths.			Cases.	Deaths.
Alabama:				New York:			
Birmingham.....	0	.....	1	Jamestown.....	0	1	.....
Idaho:				New York.....	3	7	5
Boise.....	0	1	.....	Syracuse.....	0	7	1
Illinois:				North Carolina:			
Chicago.....	5	.....	2	Wilmington.....	0	1	.....
Iowa:				Ohio:			
Des Moines.....	0	1	1	Cleveland.....	1	2	.....
Kansas:				Pennsylvania:			
Topeka.....	0	1	1	Easton.....	.....	1	.....
Maryland:				Philadelphia.....	1	1	.....
Baltimore.....	2	3	.....	Rhode Island:			
Massachusetts:				Providence.....	0	1	.....
Attleboro.....	0	1	.....	Tennessee:			
Boston.....	2	5	.....	Chattanooga.....	0	1	.....
Brookline.....	0	1	.....	Utah:			
Fall River.....	0	1	.....	Salt Lake City.....	0	1	1
Peabody.....	0	1	.....	Wisconsin:			
Michigan:				Beloit.....	0	1	.....
Detroit.....	1	1	.....			

RABIES IN ANIMALS.

City.	Cases.	City.	Cases.
California:		Massachusetts:	
Los Angeles.....	6	Winthrop.....	2
Kentucky:			
Louisville.....	3		

SCARLET FEVER.

See p. 2454; also Telegraphic weekly reports from States, p. 2441, and Monthly summaries by States, p. 2445.

SMALLPOX.

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1921, inclusive. In instances in which data for the full seven years are incomplete, the median is that for the number of years for which information is available.

City.	Median for previous years.	Week ended Sept. 16, 1922.		City.	Median for previous years.	Week ended Sept. 16, 1922.	
		Cases.	Deaths.			Cases.	Deaths.
California:				New Hampshire:			
Los Angeles.....	0	1	.....	Manchester.....	0	1	.....
San Francisco.....	2	2	.....	New York:			
Colorado:				Jamestown.....	0	1	.....
Denver.....	1	2	2	Watertown.....	0	2	.....
Indiana:				Ohio:			
Indianapolis.....	0	1	.....	Chillicothe.....	0	1	.....
Iowa:				Springfield.....	0	1	.....
Des Moines.....	1	1	.....	Toledo.....	0	2	.....
Michigan:				Oregon:			
Detroit.....	1	1	.....	Portland.....	5	9	.....
Minnesota:				Tennessee:			
Duluth.....	0	1	.....	Memphis.....	0	1	.....
Missouri:				Washington:			
Kansas City.....	0	1	.....	Tacoma.....	0	2	.....
Montana:				Wisconsin:			
Great Falls.....	1	1	.....	Superior.....	0	2	.....
Nevada:							
Reno.....	0	1	.....			

CITY REPORTS FOR WEEK ENDED SEPTEMBER 16, 1922—Continued.

TETANUS.

City.	Cases.	Deaths.	City.	Cases.	Deaths.
Alabama:			Ohio:		
Birmingham.....		1	Toledo.....		1
Mobile.....		1	Oregon:		
Connecticut:			Portland.....		1
Hartford.....	1		Pennsylvania:		
Kentucky:			Philadelphia.....	1	1
Louisville.....		1	Rhode Island:		
Massachusetts:			Providence.....		1
Boston.....	2		Texas:		
Minnesota:			El Paso.....	1	1
Minneapolis.....		1	Galveston.....		1
Missouri:					
St. Louis.....	1				

TUBERCULOSIS.

See p. 2454; also Telegraphic weekly reports from States, p. 2441.

TYPHOID FEVER.

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1921, inclusive. In instances in which data for the full seven years are incomplete, the median is that for the number of years for which information is available.

City.	Median for pre- vious years.	Week ended Sept. 16, 1922.		City.	Median for pre- vious years.	Week ended Sept. 16, 1922.	
		Cases.	Deaths.			Cases.	Deaths.
Alabama:				Iowa:			
Birmingham.....	9	18	3	Council Bluffs.....	0	1	
Mobile.....	1		1	Dubuque.....	0	2	
Arkansas:				Iowa City.....	0	1	
Hot Springs.....	0	1		Waterloo.....		2	1
North Little Rock.....	0		1	Kansas:			
California:				Atchison.....	0	2	
Eureka.....	0	1		Fort Scott.....	0	1	
Long Beach.....	0	2		Hutchinson.....	0	1	
Los Angeles.....	4	4	1	Kansas City.....	1	2	
Oakland.....	2	2		Salina.....	1	2	
Riverside.....	0	3		Wichita.....	3	2	
Stockton.....	0	5	1	Kentucky:			
Colorado:				Covington.....	1	1	
Denver.....	6	2	1	Louisville.....	6	9	1
Pueblo.....	5	3		Louisiana:			
Trinidad.....	0	2		New Orleans.....	4	2	
Connecticut:				Maine:			
Bridgeport.....	2	2	1	Bath.....	0	1	
New Haven.....	1	2		Maryland:			
District of Columbia:				Baltimore.....	24	8	
Washington.....	12	3	1	Cumberland.....	2	1	
Georgia:				Massachusetts:			
Augusta.....		1		Adams.....	0	1	1
Macon.....	0	2		Boston.....	7	7	1
Savannah.....	1		1	Brookline.....	0	1	
Idaho:				Chelsea.....	2	1	
Boise.....	0	1		Everett.....	0	1	
Illinois:				Fall River.....	4	2	2
Aurora.....	0	1		Haverhill.....	0		1
Chicago.....	12		1	Lynn.....	1	3	
Evanston.....	0	1		Medford.....	0	1	
Kewanee.....	0	1		Newburyport.....	0	1	
Springfield.....	2	2	1	Somerville.....	0	2	1
Indiana:				Worcester.....	3		1
Crawfordsville.....	0	1		Michigan:			
Fort Wayne.....	2	4		Detroit.....	11	4	1
Indianapolis.....	4	1		Flint.....	3	2	
Logansport.....	0	3		Highland Park.....	0	1	
Mishawaka.....	0		1	Holland.....	0	1	
				Kalamazoo.....	0	2	
				Sault Ste. Marie.....	0		1

CITY REPORTS FOR WEEK ENDED SEPTEMBER 16, 1922—Continued.

TYPHOID FEVER—Continued.

City..	Median for pre- vious years.	Week ended Sept. 16, 1922.		City.	Median for pre- vious years.	Week ended Sept. 16, 1922.	
		Cases.	Deaths.			Cases.	Deaths.
Minnesota:				Oregon:			
Minneapolis.....	3	2		Portland.....	2	3	
Missouri:				Pennsylvania:			
Kansas City.....	1	1		Braddock.....	0	1	
St. Louis.....	12	9		Columbia.....	0	1	
Montana:				Easton.....	0	1	
Great Falls.....	1	1		Erie.....	0	1	
Nebraska:				Johnstown.....	1	1	
Omaha.....	3	1		New Castle.....	1	1	
Nevada:				Philadelphia.....	24	18	2
Reno.....	0	2		Pittsburgh.....	8	4	
New Jersey:				Reading.....	2	3	
Jersey City.....	2	3		Shenandoah.....	0	1	
Newark.....	3	1		West Chester.....	0	1	
Paterson.....	2	1		Rhode Island:			
West Hoboken.....	0	1		Pawtucket.....	0	2	
New Mexico:				Providence.....	4	3	
Albuquerque.....	0	6		South Carolina:			
New York:				Charleston.....	2	7	3
Albany.....	4	2		Columbia.....	1	1	
Buffalo.....	6	5		Greenville.....	1		1
New York:	70	52	6	Tennessee:			
Newburgh.....	0	1		Knoxville.....	3	11	2
Peekskill.....	0	1		Memphis.....	3	3	
Rochester.....	2	1		Nashville.....	9	7	2
Syracuse.....	2	7		Texas:			
Troy.....	3	1		Dallas.....	3	2	
Watertown.....	0	3		El Paso.....	2	2	
North Carolina:				Forth Worth.....	1	1	1
Durham.....	1	2		Utah:			
Raleigh.....	1	1		Salt Lake City.....	2	2	
Wilmington.....	1	2		Vermont:			
Winston-Salem.....	5	2		Burlington.....	0	1	
Ohio:				Virginia:			
Akron.....	1	2		Norfolk.....	2	1	
Cambridge.....	1	1		Richmond.....	5	3	1
Canton.....	1	12		Roanoke.....	3	3	
Chillicothe.....	1	1		Washington:			
Cincinnati.....	4	3	2	Spokane.....	0	1	
Cleveland.....	6	4	1	West Virginia:			
Cleveland Heights.....	0	1		Bluefield.....	0	7	1
East Cleveland.....	0	1		Charleston.....	2	4	
Lima.....	2	3		Fairmont.....	1	3	
Piqua.....	2	2		Huntington.....	1		1
Toledo.....	4	4		Martinsburg.....	0	1	
Zanesville.....	0	1		Wheeling.....	0	3	
Oklahoma:				Wisconsin:			
Oklahoma.....	2	4		Appleton.....	0	1	
Tulsa.....	2	2		Beloit.....	0	1	

CITY REPORTS FOR WEEK ENDED SEPTEMBER 16, 1922—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS.

City.	Popula- tion Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuber- culosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Alabama:										
Anniston.....	17,734		3							
Birmingham.....	178,806	42	4				9		9	2
Mobile.....	60,777	14	2				3			
Montgomery.....	43,464	12	1				2			1
Tuscaloosa.....	11,996		2							
Arizona:										
Tucson.....	20,292	8								2
Arkansas:										
Hot Springs.....	11,695	4								
Little Rock.....	65,142		2				2		1	
North Little Rock.....	14,048									1
California:										
Alameda.....	28,806	7								
Bakersfield.....	18,638	10								1
Eureka.....	12,923	2	7	1						
Glendale.....	13,536	9								3
Long Beach.....	55,593	26	2				1			
Los Angeles.....	576,673	162	42	2	1		5		67	21
Oakland.....	216,261	50			1				4	4
Pasadena.....	45,354	15								2
Richmond.....	16,843	2								
Riverside.....	19,341	4	2						1	1
Sacramento.....	65,908	16	3		1		8		6	1
San Bernardino.....	18,721	8							1	
San Diego.....	74,683	31	3		1		2		2	2
San Francisco.....	506,676	142	31	3	2		7		38	7
Santa Ana.....	15,485	4	1							
Santa Cruz.....	10,917	3			1					
Stockton.....	40,296	15	8						1	2
Vallejo.....	21,107	2								
Colorado:										
Colorado Springs.....	30,105						2		8	1
Denver.....	256,491	78	45	2			11			12
Pueblo.....	43,050	10					1			1
Trinidad.....	10,906		1							
Connecticut:										
Bridgeport.....	143,555	24	2		3	1	4		4	3
Bristol.....	20,620	3							2	
Derby.....	11,238	2					1			
Fairfield (town).....	11,475	2			1		1			
Greenwich (town).....	22,123				1				1	
Hartford.....	138,036	24	5		5		2		1	1
Manchester (town).....	18,370	4								
Milford (town).....	10,193	3								
New Britain.....	59,316	10	7				1			
New Haven.....	162,537	27	2		1		2		5	3
New London.....	25,688	6	3							1
Norwich (city).....	22,304	9							1	2
Stonington (town).....	10,236	1	1	1			1			
District of Columbia:										
Washington.....	437,571	104	11				2		28	11
Florida:										
Tampa.....	51,608	10	8						3	2
Georgia:										
Atlanta.....	200,616	64	23	1			7		1	7
Augusta.....	52,548	13	1							
Brunswick.....	14,413	4								
Macon.....	52,995		4							
Rome.....	13,252		1							
Savannah.....	83,252	37							1	2
Valdosta.....	10,783	3							1	2
Idaho:										
Boise.....	21,393	7					2			
Pocatello.....	15,001	6								1
Illinois:										
Alton.....	24,682	2	2							1
Aurora.....	36,397	8	1						1	1
Bloomington.....	28,725	6								
Centralia.....	12,491	1								
Champaign.....	15,873				1					
Chicago.....	2,701,705	553		15		1				28
Cicero.....	44,995	4	1							
Danville.....	33,776	9					1		4	1
Elgin.....	27,454	2	3				1			

CITY REPORTS FOR WEEK ENDED SEPTEMBER 16, 1922—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Popula- tion Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuber- culosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Illinois—Continued.										
Evanston.....	37,234	5			1		1		2	
Forest Park.....	10,768		1							
Freeport.....	19,669	5	1				1		1	
Galesburg.....	23,834	12	1						1	1
Kewanee.....	16,026	3					4			
Mattoon.....	13,552	1								
Oak Park.....	39,858	10	1				1			
Peoria.....	76,121	11					20			
Quincy.....	35,978	14								
Springfield.....	59,183	20							5	2
Indiana:										
Anderson.....	29,767	4	3							
Clinton.....	10,962	6								
Crawfordsville.....	10,139	0			1					
East Chicago.....	35,967	6	1	1						2
Fort Wayne.....	86,549	23	4	1			1		1	1
Frankfort.....	11,585	4								
Gary.....	55,378	11	1	1			4			
Hammond.....	36,004	11	2							
Indianapolis.....	314,194	76	19	1	1		8		1	5
Kokomo.....	30,067	1	1							
La Fayette.....	22,486	5	3						1	
Logansport.....	21,626	2								
Mishawaka.....	15,195	4	1							1
Muncie.....	36,524	7					1			1
Newcastle.....	14,458	1	1							
South Bend.....	70,983	10	2		1		5		4	
Terre Haute.....	66,083	14	5		1		1			
Iowa:										
Burlington.....	24,057	4	1				1		2	
Clinton.....	24,151		12							
Council Bluffs.....	36,162	3	1				3			
Davenport.....	56,727	1	5				1			
Des Moines.....	126,468	1	3				7			
Dubuque.....	39,141						2			
Iowa City.....	11,267		1							
Mason City.....	20,065	5	7							
Muscatine.....	16,068	2	3							
Ottumwa.....	23,003		1							
Sioux City.....	71,227						3			
Waterloo.....	36,230		2		2		5			
Kansas:										
Atchison.....	12,630		3							
Coffeyville.....	13,452	0					1			
Fort Scott.....	10,693	4	4							
Hutchinson.....	23,298						1		2	
Kansas City.....	101,177		1				2		8	
Lawrence.....	12,456	2								1
Leavenworth.....	16,912		3							
Salina.....	15,085	3					1			
Topeka.....	50,022	13	50				1		3	
Wichita.....	72,217	26	9	1			8		2	1
Kentucky:										
Covington.....	57,121	10	3							3
Lexington.....	41,534	11								1
Louisville.....	234,891	67	14		1		3		17	4
Owensboro.....	17,424		1						1	
Paducah.....	24,735		1							
Louisiana:										
New Orleans.....	387,219	104	6		1		1		19	13
Maine:										
Auburn.....	16,985	5								
Bangor.....	25,978								3	
Bath.....	14,731	2			2					
Biddeford.....	18,008	7	1				1		2	
Lewiston.....	31,791	6					1			
Portland.....	69,272	12	2	1						
Sanford (town).....	10,691	1								
Maryland:										
Baltimore.....	733,826	176	17		6		6		32	16
Cumberland.....	29,837	11	2						1	

CITY REPORTS FOR WEEK ENDED SEPTEMBER 16, 1922—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Popula- tion Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuber- culosis.		
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	
Massachusetts:											
Adams (town).....	12,967	2	3								
Amesbury (town).....	10,036	4									
Arlington (town).....	18,665	2	1		1		1				
Attleboro.....	19,731	7								1	
Belmont (town).....	10,749	3	1								
Beverly.....	22,561	4									
Boston.....	748,060	169	29	3	11		3		43	6	
Braintree (town).....	10,580	4									
Brookline.....	37,748	11	4							1	
Cambridge.....	109,694	17	2				1		2	3	
Chelsea.....	43,184	12	1						2		
Chicopee.....	36,214	1									
Clinton.....	12,979	3							1		
Danvers.....	11,108				2					2	
Everett.....	40,120	3	2				2		1		
Fall River.....	129,485	23	3	1	9		6		2	2	
Frammingham.....	17,033	5			2				1		
Gardner.....	16,971	2									
Greenfield.....	15,462	4			1		1				
Haverhill.....	53,884	9	1				2		1		
Holyoke.....	60,203	12	3				1		4		
Lawrence.....	94,270	21	7							2	
Leominster.....	19,744	5									
Lowell.....	112,759	21	2				2		3	2	
Lynn.....	99,148	17	3		4		2		3	1	
Malden.....	49,103	5	1				3		1		
Medford.....	39,038	5							2	1	
Melrose.....	18,204	9									
Methuen.....	15,189	4		1					1		
New Bedford.....	121,217	39	3				1		4	6	
Newburyport.....	15,618	4			2				1		
Newton.....	46,054	8	1						1	1	
North Adams.....	22,282	4							1	2	
Northampton.....	21,951	5									
Peabody.....	19,552	5	2				1		1		
Pittsfield.....	41,763	6	1	1					1		
Plymouth.....	13,045	4									
Quincy.....	47,876	8			1				2		
Salem.....	42,520	4					1		2		
Somerville.....	93,091	10	1				1		1		
Southbridge.....	14,245	4	1								
Springfield.....	129,614	25	2		2				3	4	
Taunton.....	37,137	16									
Wakefield.....	13,025	1			1						
Watertown.....	21,457	1	4								
Webster.....	13,258	3									
West Springfield.....	13,443	3								1	
Westfield.....	18,604	7	2						1	1	
Winthrop.....	15,455	1									
Woburn.....	16,574	3									
Worcester.....	179,754	39	2	1			3		7	2	
Michigan:											
Alpena.....	11,101						2				
Ann Arbor.....	19,516	10					1			1	
Battle Creek.....	36,164						1				
Benton Harbor.....	12,233	9	2				2				
Detroit.....	993,678	161	47		3		31		43	15	
Flint.....	91,599	16	18	1			5				
Grand Rapids.....	137,634	25	4		1		1		7		
Hamtramck.....	48,615	0	2						1		
Highland Park.....	46,499	7								1	
Holland.....	12,183	0									
Ironwood.....	15,739	3					1				
Kalamazoo.....	48,487	17	9								
Marquette.....	12,718	2	1		1						
Muskegon.....	36,570	7	1				2			1	
Pontiac.....	34,273	13	1				1			1	
Port Huron.....	25,944	10					2				
Saginaw.....	61,903	20	1				1				
Sault Ste. Marie.....	12,096	6					1	1			

CITY REPORTS FOR WEEK ENDED SEPTEMBER 16, 1922—Continued.

DIPHtheria, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Popula- tion Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuber- culosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Minnesota:										
Duluth.....	98,917	16	2						6	1
Hibbing.....	15,089	3					3			
Minneapolis.....	380,582	72	24	2	1		19		9	3
Rochester.....	13,722	14							1	1
St. Cloud.....	15,873	2								
St. Paul.....	294,698	50	8		2		13		10	4
Virginia.....	14,022						4			
Winona.....	19,143	7	1							
Missouri:										
Independence.....	11,686	5								
Joplin.....	29,902		1							
Kansas City.....	324,410	74	8		1		2		5	4
St. Joseph.....	77,939	28	1							
St. Louis.....	772,897	141	13				6		36	10
Springfield.....	39,631	11								1
Montana:										
Butte.....	41,611	9	1						1	
Great Falls.....	24,121	5	4							
Missoula.....	12,668	4							1	1
Nebraska:										
Lincoln.....	54,948	9								1
Omaha.....	191,601	55	16	1			1			6
Nevada:										
Reno.....	12,016	4								
New Hampshire:										
Berlin.....	16,104	6								
Concord.....	22,167	9							3	
Dover.....	13,029	0			1					
Keene.....	11,210	4								
Manchester.....	78,384	16	1							
New Jersey:										
Asbury Park.....	12,400	7	1						2	
Atlantic City.....	50,707	14			1				1	
Bayonne.....	76,754		2				1			
Belleville.....	15,660				3					
Bloomfield.....	22,070	5			1					1
Clifton.....	26,470	1	2		1					
East Orange.....	50,710	6							1	
Elizabeth.....	95,783		6	1	1		2		2	
Englewood.....	11,627	2	2							
Garrfield.....	19,381	0	1						1	
Harrison.....	15,721								1	
Hoboken.....	68,166	10			1				2	1
Jersey City.....	298,103		10				3		4	
Kearny.....	26,724	4			2		1			1
Montclair.....	28,810	0					2		2	
Morristown.....	12,548	6								
Newark.....	414,524	83	9	2	10		6		19	7
Orange.....	33,268	7							3	
Passaic.....	63,841	10	5	2	2		1		4	1
Paterson.....	135,875		4						6	
Perth Amboy.....	41,707	8	3		2				1	1
Phillipsburg.....	16,923	3	1							
Plainfield.....	27,700	6					1		1	
Summit.....	10,174									
Trenton.....	119,289	2	7				1		3	2
West Hoboken.....	40,074						1		1	
West New York.....	29,926	0								
West Orange.....	15,573				2		1			
New Mexico:										
Albuquerque.....	15,157	8	2				3		5	3
New York:										
Albany.....	113,344		3		1		1		4	
Auburn.....	36,192	9		2			1			
Buffalo.....	506,775	115	12				5		17	9
Cohoes.....	22,987	7	2				1			
Elmira.....	45,393		3							
Geneva.....	14,648	1								
Hornell.....	15,025	1								
Hudson.....	11,745	3	2							
Ithaca.....	17,004	3								
Jamestown.....	38,917	7	2							
Lackawanna.....	17,918	1					2			

CITY REPORTS FOR WEEK ENDED SEPTEMBER 16, 1922—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Popula- tion Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuber- culosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
New York—Continued.										
Little Falls.....	13,029	4								
Lockport.....	21,368	1	1							
Middletown.....	18,420								2	
New York.....	5,620,048	928	86	8	16	1	30	1	251	78
Newburgh.....	30,366	12								2
Niagara Falls.....	50,760	14			1		1			
North Tonawanda.....	15,482	9					5		1	
Olean.....	20,506	4	1							
Peekskill.....	15,868	2			1					
Port Chester.....	16,573	4								
Poughkeepsie.....	35,000	7	2							
Rochester.....	295,750	58	12		7		1		19	5
Saratoga Springs.....	13,181	5							1	
Schenectady.....	88,723	25	3				3			1
Syracuse.....	171,717	44	18	2			8		3	3
Troy.....	72,013	16	1							
Watertown.....	31,285	10	2		1					
White Plains.....	21,031	4			1				1	
Yonkers.....	100,176	17	1	1			1			1
North Carolina:										
Durham.....	21,719	2	4						1	1
Greensboro.....	19,861	3								
Raleigh.....	24,418	16	3				1			3
Rocky Mount.....	12,742	2								1
Salisbury.....	13,884	7								
Wilmington.....	33,372	13	3							
Winston-Salem.....	48,395	6	4				3		5	1
North Dakota:										
Fargo.....	21,961	0	5				1			
Grand Forks.....	14,010						11			
Ohio:										
Akron.....	208,435	18	2		3		1		1	
Ashtabula.....	22,082	4	1	1						
Barberton.....	18,811	2	2				1			
Cambridge.....	13,104	3			1					
Canton.....	87,091	12	3				1			
Chillicothe.....	15,831	4							1	
Cincinnati.....	401,247	115	2		2		1		19	12
Cleveland.....	796,841	146	25	2			21		48	10
Cleveland Heights.....	15,226				1					
Coshocton.....	10,847		1							
Dayton.....	152,359	36	4		1		9		1	
East Cleveland.....	27,292	2								
East Youngstown.....	11,237		1							
Findlay.....	17,021	3								
Fremont.....	12,468	2	1							
Hamilton.....	39,675	7					3		2	
Kenmore.....	12,683						2			
Lancaster.....	14,706	5					1			1
Lima.....	41,326	7		1						1
Lorain.....	37,295									
Mansfield.....	27,824	5	3				3			
Marion.....	27,891						1			
Martins Ferry.....	11,634	3					2			
Middletown.....	23,594	7								
New Philadelphia.....	10,718									
Newark.....	26,718	9	2				2			
Niles.....	13,080	3					1			
Norwood.....	24,966	3								
Piqua.....	15,044	0					2			
Sandusky.....	22,897	4								
Springfield.....	60,840	6					1			1
Steubenville.....	28,508	9					1			
Toledo.....	243,164	51	11		4	1	2		1	4
Youngstown.....	132,358	25	14	1					1	1
Zanesville.....	29,569	11	1				1			
Oklahoma:										
Oklahoma.....	91,295	10	3				3		1	
Tulsa.....	72,075						3			
Oregon:										
Portland.....	258,288	39	1		1		2		18	3

CITY REPORTS FOR WEEK ENDED SEPTEMBER 16, 1922—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Popula- tion Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuber- culosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Pennsylvania:										
Allentown.....	73,502		1				1		2	
Altoona.....	60,331						1			
Ambridge.....	12,730		2				1			
Bethlehem.....	50,358		1							
Carnegie.....	11,516		1							
Carrick.....	10,504						2			
Chambersburg.....	13,171		1				2			
Chester.....	58,030				2					
Columbia.....	10,836						5			
Dubois.....	13,681		1							
Easton.....	33,813						1			
Erie.....	93,372		1				3		9	
Farrell.....	15,586		1							
Greensburg.....	15,033		1							
Harrisburg.....	75,917						2			
Hazleton.....	32,277		1							
Johnstown.....	67,327								1	
Lancaster.....	53,150						1		2	
McKee's Rocks.....	16,713		23							
McKeesport.....	46,781		2				1		1	
Monessen.....	18,179		1				2			
Nanticoke.....	22,614								3	
New Castle.....	44,938						1			
New Kensington.....	11,987									
North Braddock.....	14,928		1		2					
Oil City.....	21,274						1			
Philadelphia.....	1,823,779	375	27		81	4	16	1	61	21
Phoenixville.....	10,484		1							
Pittsburgh.....	588,343		14		23		17		6	
Pittston.....	18,497						1			
Plymouth.....	16,500		3							
Reading.....	107,784		4		1					
Scranton.....	137,783		2		1		1		9	
Sharon.....	21,747		1		1		1			
Shenandoah.....	24,726		1							
Steelton.....	13,428		2							
Sunbury.....	15,721		1							
Swissvale.....	10,903		3		1		1			
Tamaqua.....	12,363						1			
Wilkes-Barre.....	73,833						2		1	
Wilkinsburg.....	24,403						1			
Woodlawn.....	12,495		1		5					
York.....	47,512		6		1		4			
Rhode Island:										
Cranston.....	29,407	2								
Cumberland (town).....	10,077	1					1			
Newport.....	30,255	4	4							1
Pawtucket.....	64,248	12					1			
Providence.....	237,595	44	3		2		2			4
South Carolina:										
Charleston.....	67,957	24	1							3
Columbia.....	37,524		3				3		1	
Greenville.....	23,127	6	1				3			
South Dakota:										
Sioux Falls.....	25,202	4								1
Tennessee:										
Chattanooga.....	57,895		2				2			
Knoxville.....	77,818		3				1		1	1
Memphis.....	162,351	48	4	1			1		5	4
Nashville.....	118,342	22	3				2		3	
Texas:										
Beaumont.....	40,422	8								
Corpus Christi.....	10,522	4								
Dallas.....	158,976	39	14	1			4	1		1
El Paso.....	77,560	28			2					11
Fort Worth.....	106,482	18	4	1			2		4	1
Galveston.....	44,255	5							1	1
Houston.....	138,276	31								1
Waco.....	38,500	6								
Utah:										
Provo.....	10,303	3					1			
Salt Lake City.....	118,110	21	4							2

CITY REPORTS FOR WEEK ENDED SEPTEMBER 16, 1922—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Popula- tion Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuber- culosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Vermont:										
Burlington.....	22,779	9	1							1
Rutland.....	14,954	5								
Virginia:										
Alexandria.....	18,060	1					1			
Lynchburg.....	30,070	7	1						1	
Norfolk.....	115,177		1				1		5	6
Petersburg.....	31,012	4	2		1		6		4	
Portsmouth.....	54,387	17	2							2
Richmond.....	171,667	42	19				7		2	2
Roanoke.....	50,842	10	6				1			1
Washington:										
Bellingham.....	25,585						1			
Seattle.....	315,312		3						17	
Spokane.....	104,437						2			
Tacoma.....	96,965		2				2			
West Virginia:										
Bluefield.....	15,282	4	5		1		1		1	
Charleston.....	39,608	7	3				2		3	2
Clarksburg.....	27,869	5	2				2			
Huntington.....	50,177	15	1							
Martinsburg.....	12,515						1			
Moundsville.....	10,669	4								
Parkersburg.....	20,050	5					3			1
Wheeling.....	56,208	19	2		2		3		3	2
Wisconsin:										
Ashland.....	11,334		4							
Beloit.....	21,284	1					3			
Fond du Lac.....	23,427	1							2	
Green Bay.....	31,017		1				2			
Janesville.....	18,293	4								
Kenosha.....	40,472	9			1					1
La Crosse.....	30,421				2					
Madison.....	38,378								4	
Manitowoc.....	17,563		1						1	
Marinette.....	13,610		1				1			
Milwaukee.....	457,147		7		13		13		24	
Oshkosh.....	33,162	10					1		1	2
Racine.....	58,593	11		1			1			1
Stevens Point.....	11,371		1							
Superior.....	39,671	7	1		2					
Waukesha.....	12,558						2			
Wausau.....	18,661		3							
West Allis.....	13,745				2		2		3	

FOREIGN AND INSULAR.

YELLOW FEVER ON VESSEL.

Schooner "William E. Burnham"—At Mobile Quarantine, Ala.—From Sierra Leone and Dutch Guiana.

The schooner *William E. Burnham*, from Freetown, Sierra Leone, and Paramaribo and Mungo, Dutch Guiana, arrived at quarantine, Mobile, Ala., September 14, 1922, with the history of a death on board occurring on the evening of September 13. On the basis of the clinical history as furnished by the captain and the necropsy findings, yellow fever was given as the cause of death.

The vessel left Gulfport, Miss., for West Africa, in April, 1922. It sailed from Freetown, Sierra Leone, June 25, 1922, for the United States, via Paramaribo, at which place it arrived August 6. It went up the river to Mungo to load ore August 12, returned to Paramaribo and sailed therefrom August 23.

The deceased, a member of the crew, first notified the captain of his illness on September 6.

Six other members of the crew were reported to have had fever after the vessel had left Mungo and also subsequent to its sailing from Paramaribo.

BRAZIL.

Plague—Porto Alegre.

During the two-week period ended August 26, 1922, 3 deaths from bubonic plague were reported in Porto Alegre, Brazil. It is stated that plague is endemic in Porto Alegre and that the infection is scattered throughout the city.

CAPE VERDE ISLANDS.

Plague—St. Vincent.

According to official reports dated September 4, 1922, plague is still present in St. Vincent, Cape Verde Islands, in spite of the efforts that have been made by the sanitary authorities to eradicate it. The Portuguese colonial minister has taken steps to isolate, in a

special building provided for the purpose, all persons sick with plague or suspected of being infected, and large supplies of anti-plague vaccines and serums have been sent to St. Vincent from Lisbon. Arrangements have also been made to have more physicians sent from Lisbon to the island.

ECUADOR.

Plague-Infected Rats—Guayaquil.

During the month of August, 1922, out of 29,157 rats captured, 8,529 were examined for plague infection and 17 found infected.

EGYPT.

Anthrax—Alexandria.

Two deaths from anthrax were reported in Alexandria, Egypt, during the week ended August 26, 1922.

INDIA.

Sanitary Report for Rangoon, 1921.

The annual report of the health officer of Rangoon, India, for the year 1921 gives the total number of deaths occurring in Rangoon for that year as 12,066, a rate of 35.28 per 1,000 population, as against 12,140 deaths in 1920, or 41.39 per 1,000; the number of births as 6,254, a birth rate of 18.29 per 1,000 population, as against 6,319 births in 1920, or 21.54 per 1,000; and the number of infant deaths as 2,018, or an infantile mortality of 322.67, as against 1,918 deaths in 1920, a rate of 303.53. The population of Rangoon, according to the census of 1921, is 341,962, showing a decennial increase of 48,646.

The proportion of male to female births was in the ratio of 106.4 to 100. The number of stillbirths was 442, or 7 per cent of the total births.

A comparison of the death rates and infantile mortality rates for the years 1916-1921 is given in the following table:

Year.	Death rate.	Infant mortality rate.	Year.	Death rate.	Infant mortality rate.
1916.....	36.13	288.01	1919.....	53.03	354.74
1917.....	33.70	286.72	1920.....	41.39	303.53
1918.....	32.54	329.26	1921.....	35.28	322.67

Certain diseases were reported during 1921 as follows: Plague—cases 1,229, deaths 1,126; cholera—cases 125, deaths, 101; small-pox—cases 96, deaths 18; respiratory diseases—deaths 3,097.

SIAM.

Vital Statistics—Fiscal Year 1921-22.

According to figures compiled under the direction of the medical officer of health of Bangkok, Siam, for the fiscal year ended March 31, 1922, the population of the municipal area is given as 324,422—males, 188,934; females, 135,488. The high proportion of males to females in the total population is due to the large proportion of males among the Chinese—80,045 males and 22,524 females.

The death rate (including all nationalities) for the fiscal year under report was 32.6 per 1,000; the infant mortality rate, 220.9 per 1,000 births; and the birth rate was 31.4 per 1,000 population.

VIRGIN ISLANDS.

Contagious Diseases—August, 1922.

The occurrence of contagious diseases in the Virgin Islands during the month of August, 1922, has been reported as follows:

Island and disease.	Cases.	Remarks.
In St. Thomas and St. John:		
Chancroid.....	2	Imported, 1.
Dengue.....	6	
Gonococcus infection.....	3	
Malaria.....	1	Tertian. Imported, 1; secondary, 2. Chronic pulmonary.
Syphilis.....	1	
Tuberculosis.....	1	
In St. Croix:		
Dengue.....	2	Entamebic. Bancrofti.
Dysentery.....	2	
Filariasis.....	11	
Gonorrhea.....	3	
Hookworm disease.....	2	
Leprosy.....	2	Chronic pulmonary.
Trachoma.....	1	
Tuberculosis.....	7	
Tuberculosis.....	2	Chronic pulmonary.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER.

Reports Received During Week Ended October 6, 1922.¹

The reports contained in the following tables must not be considered as complete or final, either as regards the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA.

Place.	Date.	Cases.	Deaths.	Remarks.
India.....	.....	.....	.....	June 18-July 1, 1922: Deaths, 3,643. July 2-29, 1922: Deaths, 6,292.
Bombay.....	July 23-29.....	1	1	
Calcutta.....	Aug. 13-19.....	3	3	
Rangoon.....	..do.....	3	2	
Siam:				
Bangkok.....	Aug. 6-12.....	2	1	
Syria:				
Aleppo.....	Aug. 21-Sept. 2.....	.....	.....	Present in interior.

¹ From medical officers of the Public Health Service, American consuls, and other sources.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received During Week Ended October 6, 1922—Continued.

PLAGUE.

Place.	Date.	Cases.	Deaths.	Remarks.
Algeria:				
Oran.....	Aug. 21-31.....	4	3	
Brazil:				
Bahia.....	Aug. 20-26.....	1		
Porto Alegre.....	Aug. 13-26.....		3	
British East Africa:				
Kenya Colony.....				June 1-30, 1922: Cases, 184; deaths, 172
Cape Verde Islands:				
St. Vincent.....	Sept. 4.....			Present.
China:				
Hongkong.....	Aug. 13-19.....	5	5	
Ecuador:				
Guayaquil.....	Aug. 1-31.....			Rats examined, 8,259; found infected, 17.
Egypt:				
Alexandria.....	Aug. 20-26.....	1	1	
Port Said.....	Sept. 3-9.....	1		
India:				
Calcutta.....	Aug. 13-19.....	5	5	June 18-24, 1922: Cases, 235; deaths, 170. June 25-July 1, 1922: Cases, 236; deaths, 194.
Rangoon.....	do.....	37	33	July 2-29, 1922: Cases, 1,296; deaths, 933.
Java.....	July 1-31.....	208	223	In the 5 Provinces of Java.
Madagascar:				
Tamatave.....	June 26-July 2.....	2	1	
Tananarive.....	July 10-23.....	2	2	
Mesopotamia:				
Bagdad.....	July 1-31.....	23		
Siam:				
Bangkok.....	Aug. 6-12.....	1		
Turkey:				
Constantinople.....	Aug. 27-Sept. 9.....	2	1	

SMALLPOX.

Arabia:				
Aden.....	Aug. 27-Sept. 22.....	2		
Brazil:				
Para.....	Sept. 3-10.....	16		
Rio de Janeiro.....	Aug. 13-26.....	10	3	
British East Africa:				
Dar es Salaam.....	Aug. 6-12.....	17	2	June 1-30, 1922: Cases, 5.
Kenya Colony.....				
Chile:				
Concepcion.....	Aug. 1-21.....		8	Epidemic stated to be diminishing.
Dominica.....	Sept. 3-9.....			Present.
Dominican Republic:				
Puerto Plata.....	Sept. 12-18.....	2		
San Pedro de Macoris.....	Aug. 27-Sept. 2.....	19		Report for week ended Aug. 26 not received.
Ecuador.....	Aug. 16-31.....	1		
Egypt:				
Cairo.....	May 28-June 3.....	1	1	
Do.....	June 4-24.....	3	1	
Port Said.....	June 18-24.....	1	1	
India:				
Madras.....	Aug. 20-26.....	30	22	June 18-July 1, 1922: Cases, 1,880; deaths, 681. July 2-29, 1922: Cases, 3,692; deaths, 990.
Karachi.....	do.....	1		
Mesopotamia:				
Bagdad.....	July 1-31.....	38		
Mexico:				
Chihuahua.....	Sept. 11-17.....		1	
Persia:				
Teheran.....	Apr. 23-May 22.....	2		
Portugal:				
Lisbon.....	Aug. 20-Sept. 2.....	24	9	
Russia:				
Esthonia.....	July 1-31.....	1		
Spain:				
Seville.....	Aug. 28-Sept. 10.....	15		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received During Week Ended October 6, 1922—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Switzerland:				
Berne.....	Aug. 27-Sept. 2....	12		
Zurich.....	Aug. 20-Sept. 2....	25		
Syria:				
Damascus.....	Aug. 13-26.....	2		
Turkey:				
Constantinople.....	Sept. 3-9.....	10	2	

TYPHUS FEVER.

Algeria:				
Algiers.....	Aug. 1-31.....	2	1	
Australia:				
Brisbane.....	Aug. 6-12.....	1		
Chile:				
Concepcion.....	Aug. 1-21.....		2	
China:				
Harbin.....	Aug. 22-27.....	1		
Czechoslovakia:				
Prague.....	Aug. 20-26.....	1		
Java:				
East Java—				
Soerabaya.....	July 23-Aug. 5....	4	2	
Egypt:				
Alexandria.....	Aug. 20-26.....	2	2	
Cairo.....	May 21-27.....	7	5	
Do.....	May 28-June 24....	23	17	
Port Said.....	Aug. 27-Sept. 2....	2		
Mexico:				
San Luis Potosi.....	Sept. 10-16.....			Present.
Palestine:				
Jerusalem.....	Aug. 29-Sept. 4....	1		
Persia:				
Teheran.....	Apr. 23-May 22....	4		
Russia:				
Esthonia.....	July 1-31.....	7		
Switzerland:				
Lucerne.....	Aug. 1-31.....	2		
Syria:				
Aleppo.....	Aug. 27-Sept. 2....			Present in interior.
Turkey:				
Constantinople.....	Aug. 27-Sept. 9....	4		

YELLOW FEVER.

Brazil:				
Bahia.....	July 30-Aug. 26....	3	2	
On vessel:				
Schr. William E. Burnham.	Sept. 13.....		1	At sea between Paramaribo and Mobile Quarantine, Ala., where the vessel arrived Sept. 14, 1922. The vessel left Freetown, Sierra Leone, June 25 and touched at Mungo and Paramaribo.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 1 to September 29, 1922.¹

CHOLERA.

Place.	Date.	Cases.	Deaths.	Remarks.
China:				
Amoy.....	May 14-June 24...	1	4	Present. Stated to have been imported from Shanghai.
Newchwang.....	July 27.....			
Pootung.....	Aug. 3.....			Present.
Shanghai.....	June 25-July 31...	198		Aug. 1-20: Cases, 2, foreign; deaths, 35, Chinese. July 29: Stated to be 250 cases in Chinese isolation hospital.
Tientsin.....	July 25-Aug. 19...	4	2	About 75 deaths reported for previous week.
Woosung.....	Aug. 3.....			
Greece:				
Athens.....	June 29.....	1	1	At quarantine station, among passengers from vessel carrying Russian refugees.
Saloniki.....	June 7-17.....	30	11	
India.....				Feb. 26-June 17, 1922: Deaths, 32,649. (Report for week ended Feb. 25, 1922, not received.)
Bombay.....	Apr. 23-June 17...	12	5	
Do.....	July 2-8.....	1	1	
Calcutta.....	Apr. 23-June 24...	536	378	
Do.....	June 25-Aug. 12...	47	46	
Madras.....	May 21-June 17...	3	1	
Do.....	July 16-Aug. 5....	4	2	
Rangoon.....	May 7-June 24...	116	65	
Do.....	June 25-Aug. 12...	89	55	
Indo-China:				
Saigon.....	June 25-Aug. 5....	29	27	
Philippine Islands:				Including area of 100 square km.
Manila.....	May 21-June 24...	8		
Do.....	June 25-Aug. 5....	9	1	
Province—				
Bataan.....	June 4-10.....	1		
Batangas.....	May 26-June 24...	15	11	
Do.....	June 25-July 8....	5	3	
Bulacan.....	Apr. 30-May 6....	1	1	
Camarines Sur.....	Mar. 25-Apr. 1....	1	1	
Laguna.....	Apr. 16-22.....	1		
Marinduque.....	June 25-July 1....	3	3	
Mindoro.....	Apr. 23-29.....	1		
Nueva Ecija.....	June 11-17.....	1	1	
Pampanga.....	Apr. 16-June 24...	6	5	
Do.....	June 25-July 8....	1	1	
Pangasinan.....	June 18-24.....	3	1	
Rizal.....	Apr. 2-June 24...	3	1	
Tarlac.....	May 21-June 10...	4	4	
Poland:				
Rovno.....	June 11-24.....	8	3	
Do.....	June 25-Aug. 5....	33	10	
Volhynia.....	July 2-8.....	1	1	
Zamosc.....	Aug. 21.....		1	
Rumania:				
Bucharest.....	Aug. 21.....	1		
Crangasi.....				To July 31, 1922: Cases, 11; deaths, 6. First case in soldier from frontier on Dniester River. Crangasi, a suburb of Bucharest.
Province—				
Bessarabia—				
Cobusen.....	July 24.....	1		Reported Aug. 11.
Codaeshti.....		3		
Orhei.....				
Rascautzi.....		11	1	Prefecture. Cholera reported Aug. 11 among troops in garrison.
Siam:				Reported July 29.
Bangkok.....	Apr. 30-June 17...	15	9	
Do.....	July 2-29.....	6	3	
Straits Settlements:				
Singapore.....	July 16-22.....	1	1	
Syria:				
Aleppo.....	May 27-June 3....			A few cases in interior.
Do.....	June 25-Aug. 26...			Present in interior.

¹ From medical officers of the Public Health Service, American consuls, and other sources.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 1 to September 29, 1922—Continued.

CHOLERA—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
On vessel: S. S. Chios.....	July 16.....	1		At Kavak quarantine station: Bosphorus, from Novorossysk, a Russian Black Sea port. Case occurred in a recognized carrier. Vessel carried refugees for Saloniki, Greece. Six bodies buried at sea; 12 cases landed at Kavak during stay.

PLAGUE.

Algeria:				
Algiers.....	Aug. 27.....	1		
Oran.....	Aug. 1-31.....	10	3	
Asia Minor:				
Smyrna.....	May 28-June 17...	3	1	
Do.....	June 30-Aug. 26...	8	1	District.
Australia:				
New South Wales— Sydney.....	June 1-15.....	2		Apr. 2-June 10, 1922: 19 plague-infected rats found.
Queensland— Brisbane.....	July 23-29.....			One plague rat.
Azores:				
St Michaels Island.....	June 25-Aug. 12...	28	9	From 3 to 9 miles from port of Ponta Delgada.
Brazil:				
Bahia.....	June 11-17.....	1		May 7-June 4: Rodent; occurring in one section of the city.
Perhambuco.....	May 7-13.....	1		Many dead rats found.
Porto Alegre.....	July 30-Aug. 5.....	1		
British East Africa:				
Kenya Colony.....				
Nairobi.....	Feb. 1-28.....	15	15	Mar. 1-May 31, 1922: Cases, 187; deaths, 172. July 9-15, 1922: Deaths, 14.
Ceylon:				
Colombo.....	May 6-June 24.....	13	10	Plague rats, 5.
Do.....	June 25-Aug. 12...	14	15	Plague rats, 9.
China:				
Amoy.....	May 7-June 24.....		87	May 20: From 10 to 20 deaths reported daily. July 16-Aug. 12, 1922: Present; stated to be decreasing.
Do.....	June 25-July 15.....		76	
Canton.....	May 1-June 30.....	28	23	June 17-24: Present. June 21: Mildly epidemic; 2 fatal cases in foreign physicians.
Foochow.....	May 7-June 10.....	5	4	
Do.....	July 2-Aug. 12.....	3	1	
Hongkong.....	June 4-24.....	176	104	
Do.....	June 25-Aug. 12...	129	94	
Ecuador:				
Guayaquil.....	June 1-15.....			Rats found infected, 16; examined, 3,400.
Do.....	July 1-31.....			Rats examined, 9,200; found infected, 6.
Egypt:				
City—				
Alexandria.....	June 1-28.....	21	6	Jan. 1-June 29, 1922: Cases, 280; deaths, 120. Jan. 1-Aug. 10, 1922: Cases, 414; deaths, 185.
Do.....	July 2-Aug. 22.....	14	5	
Port Said.....	June 12-25.....	2	5	Septicemic, 1.
Do.....	July 2-Aug. 19.....	27	21	Foreign cases, 2; deaths, 2.
Suez.....	May 24-June 25.....	7	6	
Do.....	July 10-Aug. 8.....	3	2	Aug. 5: One case imported from Mauritius on S. S. Dumbca.
Province—				
Assiout.....	May 30-June 23...	14	8	Septicemic, 1.
Do.....	July 11-Aug. 5.....	6	3	
Benisouef.....	May 26-June 30...	19	7	
Do.....	July 2-Aug. 7.....	28	13	
Fayoum.....	June 3-29.....	8	4	
Do.....	July 2-20.....	13	3	
Charbieh.....	May 26-June 30...	37	13	
Do.....	July 2.....	3		
Menoufieh.....	July 20.....	1	1	
Minieh.....	June 2-29.....	24	7	
Do.....	July 14-Aug. 19...	16	7	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 1 to September 29, 1922—Continued.

PLAGUE—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
France:				
Paris.....	Aug. 11-18.....	4	.....
Greece:				
Patras.....	Apr. 24-June 25...	5	3	
Hawaii:				
Hamakua.....	June 30-July 4....	1	1	At Kalopa Homesteads. Case, Hawaiian.
Do.....	July 8.....	.....	.....	Hamakua Mill Co. One plague rat trapped; found positive, July 14, 1922.
Honokaa.....	Aug. 19.....	1	1	Japanese; bubonic. Aug. 12, 1922; 2 plague rats found.
Honakaa Mill.....	Aug. 24.....	1	1	Japanese; pneumonic.
Kalopa.....	July 13.....	1	1	Contact with case at Kalopa Homesteads, July 4.
Paauhau.....	June 30.....	.....	.....	One plague rat trapped at Paauhau Gulch, June 29; found positive, June 30, 1922.
Paauilo.....	July 7.....	.....	1	At Pohaken, Japanese.
Pohaken.....	Aug. 1-16.....	2	2	Aug. 1, Japanese child; case reported positive for plague Aug. 6, 1922. Form, pneumonic. Aug. 16, one fatal case in Japanese.
Pohakuhaku.....	July 12.....	1	1	Hawaiian. Reported positive, July 19.
India.....				Apr. 23-June 17, 1922: Cases, 6,075; deaths, 4,642. June 25-July 13, 1922: Cases, 747; deaths, 567.
Bombay.....	Apr. 23-June 24....	168	123	Surrounding country, July 2-8, 1922: Cases, 21; deaths, 16.
Do.....	June 25-Aug. 12....	19	12	
Calcutta.....	Apr. 23-June 24....	56	54	
Do.....	June 25-July 22....	11	11	
Karachi.....	May 23-June 24....	59	55	
Do.....	June 25-July 8....	3	3	
Madras Presidency.....	May 21-June 24....	74	36	
Do.....	June 25-Aug. 12....	676	433	
Rangoon.....	May 6-June 24....	175	161	
Do.....	June 25-Aug. 12....	253	228	
Indo-China:				
Saigon.....	Apr. 23-June 24....	30	21	
Do.....	June 25-Aug. 5....	8	5	Including area of 100 square kilometers.
Italy:				
Catania.....	June 17.....	1	.....
Naples.....	July 18-25.....	4	.....	Occurring in suburbs, viz. at Torre Annunziata, July 18-20, 3 cases; San Giovanni a Teduccio, July 25, 1 case.
Japan:				
Osaka.....	July 11-20.....	7	6	Reported as having occurred during past month, cases, 9; deaths, 8.
Java.....				Month of April, 1922: Report of the 7 Provinces of Java: Cases, 413; deaths, 495. May 1-31, 1922: Cases, 293; deaths, 310; occurring in 6 Provinces. June 1-30, 1922: Cases, 222; deaths, 259; occurring in 5 Provinces.
East Java—				Epidemic.
Soerabaya.....	May 7-June 24....	3	3	
Soerakarta.....	May 20.....	.....	.....
Keporen.....	.....	.....	.....
Madagascar:				
Tananarive Province—				
Anketrina.....	May 4.....	.....	1	Native village; disease stated to have been present since about Apr. 27, 1922. (Name of locality corrected.)
Tamatave.....	Aug. 21-Sept. 13....	.....	.....	Present.
Tananarive.....	May 29-June 18....	2	1	
Mesopotamia:				
Bagdad.....	Apr. 1-June 30....	268	188	
Mexico:				
Vera Cruz.....	June 30.....	.....	.....	One plague-infected rat.
Palestine:				
Jerusalem.....	July 4-Aug. 28....	33	2	In native quarter of Jaffa.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 1 to September 29, 1922—Continued.

PLAGUE—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Peru.....				May 1-15, 1922: Cases, 36; deaths 19. June 1-30, 1922: Cases, 87, deaths, 15. July 1-31, 1922: Cases, 63; deaths, 35.
Philippine Islands:				
Manila.....	June 3.....	1	1	From S. S. Taisang from Amoy, China.
Portugal:				
Lisbon.....	July 23-Aug. 6....	4	2	
Portuguese West Africa:				
Guinea.....				Reported present, Aug. 24, 1922.
Senegal:				
Dakar.....	June 1-30.....	1	1	
Do.....	July 1-31.....	2	2	
Siam:				
Bangkok.....	Apr. 30-June 3....	4	3	
Do.....	July 2-29.....	4	4	
Straits Settlements:				
Singapore.....	Apr. 30-June 24....	8	9	
Do.....	July 9-15.....	1	1	
Syria:				
Beirut.....	July 30.....	2		
Tunis:				
Tunis.....	June 30-July 27....	3	1	
Turkey:				
Constantinople.....	Aug. 20-26.....	2	1	
Union of South Africa:				
Orange Free State—				
Grootkom Farm.....	May 7-13.....			One dead plague-infected rodent found. Locality adjoins Tru-cart's Berg Farm, on which plague-infected mouse was found preceding week.
Rendezvous Ry. Sta-	May 14-20.....			Plague-infected wild rodent found near.
On vessels:				
S. S. Ardeola.....	June 25-July 8....			At Liverpool. Four plague-infected rats found dead. Vessel from Las Palmas, Canary Islands, June 26, 1922.
S. S. Dumbear.....	Aug. 5.....	1		At Suez, Egypt, from Island of Mauritius. Patient ill two days before arrival. Declared positive Aug. 6.
Greek vessel.....	July 19.....			At Messina, Italy. Cases on board. Vessel not allowed to enter.
S. S. Legie.....	July 29.....			At Hamburg, Germany. Plague rats found. Vessel from Buenos Aires, Argentina.
S. S. Southgate.....	May 30.....	1		At Thursday Island quarantine, Australia. Vessel left Calcutta May 2; Rangoon, May 9. Vessel badly rat-infested.
S. S. Taisang.....	June 1-3.....	1	1	At Manila, P. I., from Amoy, China. Patient landed at Manila June 1, 1922. The Taisang was 2½ days en route direct from Amoy.

SMALLPOX.

Arabia:				
Aden.....	May 7-June 24....	69	21	
Do.....	July 2-Aug. 12....	38	21	
Argentina:				
Rosario.....	June 1-30.....		3	
Asia Minor:				
Smyrna.....	May 14-June 24....	4		In district.
Do.....	June 25-Aug. 26....	13		Do.
Bolivia:				
La Paz.....	Mar. 1-Apr. 30....	97	16	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 1 to September 29, 1922—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Brazil:				
Bahia.....	June 25-July 1....	1	1	
Para.....	May 29-June 25....	8		
Do.....	July 3-Sept. 2....	125	1	
Rio de Janeiro.....	May 14-June 24....	48	12	
Do.....	June 25-Aug. 12....	57	11	
Sao Paulo.....	Apr. 10-June 11....	3	10	
British East Africa:				
Kenya Colony.....				Apr. 1-May 31, 1922: Cases, 10; July 9-15, 1922: Deaths 5.
Dar es Salaam.....	Apr. 16-June 10....	26		
Do.....	July 16-22.....	1		
Nairobi.....	Mar. 1-31.....	22	2	
Zanzibar.....	May 1-June 10....	36	6	
Do.....	June 24-July 1....	2		
Canada:				
Alberta—				
Calgary.....	June 18-24.....	1		
Manitoba—				
Winnipeg.....	May 6-June 17....	3		
New Brunswick—				
Kent County.....	June 25-July 1....	2		
Madawaska County.....	June 4-17.....	6		
Ontario—				
Fort William and Port Arthur.....	Aug. 6-19.....	2		
Hamilton.....	July 30-Aug. 12....	2		
London.....	Aug. 26-Sept. 2....	1		
North Bay.....	June 3-17.....	2		
Do.....	July 16-Aug. 12....	3		
Ottawa.....	June 11-July 1....	17		
Do.....	July 2-Aug. 26....	14		
Toronto.....	June 18-Sept. 9....	10		
Saskatchewan—				
Saskatoon.....	Aug. 20-26.....	1		
Ceylon:				
Colombo.....	May 14-20.....	1		
Do.....	July 16-22.....	1		
Chile:				
Concepcion.....	Mar. 14-June 20....		71	Prevalent, July 3, 1922, throughout southern Provinces.
Do.....	June 27-July 31....		17	
Quillon.....				In Concepcion Province; epidemic in May, 1922, with 60 reported cases. To June 5, epidemic.
Do.....	June 27-July 3....			Epidemic.
San Patricio.....	May 16-22.....	13		
Talcahuano.....	May 22-June 24....	33	19	May 16-22, 1922: Present.
Do.....	June 25-July 30....	5	7	
Temuco.....				Province of Cautin; epidemic in May, 1922.
Valparaiso.....	Mar. 26-June 19....		115	Incomplete; several districts not reporting.
Do.....	June 25-July 30....		46	
China:				
Amoy.....	May 7-20.....			Present June 18-24; 1 death.
Do.....	July 16-Aug. 5....			Present.
Antung.....	May 29-June 18....	4		
Do.....	July 3-16.....	5		
Chungking.....	May 28-June 24....			Present.
Do.....	June 25-July 29....			Do.
Foochow.....	May 14-20.....	1		
Hankow.....	June 25-July 1....	1		
Hongkong.....	May 14-June 24....	41	32	
Do.....	July 16-Aug. 12....	3	2	
Manchuria—				
Dairen.....	May 15-June 18....	4	1	
Do.....	June 26-July 17....	4	1	
Harbin.....	May 22-28.....	1		
Do.....	July 30-Aug. 5....	1		
Mukden.....	June 18-24.....			Present.
Do.....	July 16-22.....			Do.
Nanking.....	May 7-June 24....			Do.
Do.....	June 25-July 29....			Do.
Shanghai.....	May 22-28.....	1		Native.
Tientsin.....	May 14-20.....			Present.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 1 to September 29, 1922—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
China—Continued.				
Tsingtau.....	May 9-June 18....	4	3	Including leased territory of Kia-ochow, Japanese population along Shantung Railway, and Japanese residents, Tsinan.
Do.....	June 26-July 30....	5	3	Do.
Chosen (Korea):				
Chemulpo.....	May 1-31.....	1		
Fusan.....	May 1-June 30....	147	60	
Do.....	July 1-31.....	13	9	
Seoul.....	May 1-June 30....	26	5	
Do.....	July 1-31.....	23	8	
Cuba.....				July 1-31, 1922: Cases, 40. Reported for Preston.
Antilla.....	June 18-24.....	1		
Cienfuegos.....	June 24-July 1....	1		
Habana.....	July 1-Aug. 31....	10		
Santiago.....	June 1-30.....	3		
Dominica.....	Aug. 5.....			Present. Aug. 23: Epidemic. Island in Leeward Islands.
Dominican Republic:				
San Pedro de Macoris.....	May 21-June 24....	167	2	City and country. Corrected report.
Do.....	June 25-Aug. 19....	241	2	City and district. Corrected report.
Santo Domingo.....	June 4-24.....	3	9	Including vicinity.
Do.....	June 25-July 29....	2	4	July 30-Aug. 5, 1922: A few cases city and vicinity.
Ecuador.....	July 16-31.....	2		
Egypt:				
Alexandria.....	July 23-Aug. 12....	2	2	
Cairo.....	Apr. 30-May 20....	9	3	
Port Said.....	May 7-June 17....	2		
Finland.....	June 1-30.....	2		
Do.....	July 1-15.....	1		
Fiume.....	June 13-19.....	1		
Do.....	July 10-16.....	1		
France:				
Paris.....	June 1-10.....	1	1	
Great Britain:				
Halifax.....				Outbreak reported under date of June 17, 1922.
Huddersfield.....				Do.
Liverpool.....	Aug. 13-19.....	1		In port hospital.
London.....	July 30-Aug. 19....	5	1	
Sheffield.....	May 28-June 17....	5		
Southampton.....	June 18-24.....	2		
Greece:				
Saloniki.....	May 1-June 25....	3	1	
Do.....	July 17-23.....		1	
Syra Island.....	May 26.....	12	5	
Haiti:				
Cape Haitien.....	June 11-17.....	1		Vicinity of Cape Haitien.
Plaine du Nord.....	do.....			Present.
India:				
Bombay.....	Apr. 23-June 24....	38	17	Feb. 26-Mar. 25, 1922: Deaths, 1,162 (date of report corrected).
Do.....	July 2-15.....	4	2	Mar. 26-May 20, 1922: Deaths, 6,015. June 4-17: Cases, 1,941; deaths, 651.
Calcutta.....	Apr. 23-June 24....	84	67	
Do.....	June 25-Aug. 12....	17	14	
Karachi.....	May 23-June 24....	35	9	
Do.....	July 16-Aug. 1....	14	4	
Madras.....	May 14-June 24....	207	94	June 19-25: Cases 30: deaths, 15.
Do.....	July 2-Aug. 19....	347	152	
Rangoon.....	May 7-June 24....	37	16	
Do.....	July 2-Aug. 19....	31	13	
Indo-China:				
Saigon.....	June 30-Aug. 5....	30	22	Including area of 100 square km.
Japan:				
Kobe.....	June 19-25.....	2		
Taiwan Island.....	June 11-30.....	26	3	
Do.....	July 22-Aug. 10....	27	4	
Yokohama.....	May 29-June 25....	4	2	
Do.....	June 26-July 20....	48	8	
Java:				
West Java—				
Batavia.....	Apr. 28-June 30....	20	3	City and Province.
Do.....	July 9-Aug. 4.....	29	6	Province.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 1 to September 29, 1922—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Luxemburg.....	June 15-30.....	1	1	
Malta.....	May 1-June 15.....	4		June 1-30, 1922: Cases, 2.
Mesopotamia:				
Bagdad.....	Apr. 1-June 30.....	36	40	
Mexico:				
Chihuahua.....	June 22-July 2.....		1	
Guadalajara.....	May 1-31.....	7		
Do.....	July 1-31.....	4	1	
Manzanillo.....	June 6-25.....		4	Estimated cases, 4 to 10.
Do.....	June 27-July 3.....	6	1	Estimated.
Mexico City.....	May 21-June 24.....	129		Including municipalities in Federal district. Report June 11-17, not received.
Do.....	June 25-Aug. 19.....	154		Including municipalities in Federal district.
Nogales.....	July 22-Aug. 5.....	26	3	State of Sonora.
San Luis Potosi.....	July 23-Sept. 9.....		11	
Torreón.....	July 1-31.....		1	
Panama.....				July 1-31, 1922: Cases 4 of which 1 in nonresident and not locally reported.
Colon.....	July 1-31.....	2		
Do.....	do.....	1		
Panama.....	do.....	1		
Peru.....				May 1-15, 1922: Cases, 5; deaths 4. June 1-30, 1922: Cases, 16; deaths, 7.
Poland.....				Mar. 26-June 24, 1922: Cases, 1,210; deaths, 241.
Do.....				June 25-July 8, 1922: Cases, 58. deaths, 12.
Portugal:				
Lisbon.....	May 29-June 25.....	6	8	Corrected report.
Do.....	June 26, Aug. 19.....	69	39	July 22-Aug. 5: Cases, 19; deaths, 4.
Oporto.....	Aug. 27-Sept. 2.....	1		
Portuguese East Africa:				
Lourenço Marques.....	July 23-29.....	1		
Portuguese West Africa:				
Angola—				
Loanda.....	June 25-July 1.....		1	
Russia:				
Esthonia.....	May 1-June 30.....	6		
Lettonia.....	do.....	51		
Senegal:				
Dakar.....	June 1-30.....	4	4	
Spain:				
Barcelona.....	June 22-28.....		1	
Do.....	June 29-Aug. 16.....		2	
Corunna.....	June 11-17.....		1	
Huelva.....	Apr. 1-June 30.....		4	
Seville.....	June 11-17.....	36		Week ended June 11: Many cases.
Do.....	June 18-Aug. 27.....		100	
Valencia.....	May 21-27.....	1		
Straits Settlements:				
Singapore.....	Apr. 30-June 5.....	11	2	
Do.....	July 30-Aug. 5.....	2	1	
Switzerland:				
Basel.....	May 28-June 3.....	1		
Berne.....	May 14-20.....	1		
Do.....	July 9-Aug. 5.....	4		
Lucerne.....	July 1-31.....	1		
Zurich.....	Apr. 23-June 12.....	9		
Do.....	June 25-Aug. 12.....	23		
Syria:				
Aleppo.....	June 4-24.....			Present.
Damascus.....	June 18-24.....		2	
Do.....	June 25-Aug. 7.....	12	2	
Tunis:				
Tunis.....	July 17-23.....	1		
Turkey:				
Constantinople.....	May 21-June 24.....	21	6	
Do.....	June 25-Aug. 19.....	16	5	
Union of South Africa.....				Apr. 1-June 30, 1922: Cases, 173; deaths, 12 (colored); white, cases, 36.
Cape Province.....				Apr. 1-June 30, 1922: Cases, 87; deaths, 3 (colored); white, 6 cases.
Do.....	June 25-July 29.....			Outbreaks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 1 to September 29, 1922—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Union of South Africa—Con.				
Natal.....	July 9-15.....			Outbreaks. Apr. 1-May 31, 1922: Cases, 20; deaths, 8 (colored); white, 20 cases.
Orange Free State.....				May 1-31, 1922: Cases, 12; deaths, 1 (colored).
Do.....	June 4-27.....			Outbreaks.
Southern Rhodesia.....	May 11-June 28.....	67	4	
Do.....	June 29-Aug. 9.....	32		
Transvaal.....				Apr. 1-June 30, 1922: Cases, 54 (colored); white, 10 cases.
Do.....	July 9-29.....			Outbreaks.
Johannesburg.....	May 1-31.....	1		
Virgin Islands:				
St. Thomas.....	June 5-18.....	1	1	At quarantine. From vessel from Dominican Republic.
Yugoslavia.....				Sept. 4-24, 1921: Cases, 11; deaths, 4.
Croatia-Slavonia—				
Zagreb.....	June 4-10.....	1		
Do.....	Aug. 6-12.....	1		
Serbia.....				Oct. 23-29, 1921: Cases, 5.
Belgrade.....	June 11-17.....	1		
On vessels:				
S. S. Changsha.....	May 11.....	1		At Hongkong, China. Case landed from vessel; patient, intending passenger. Vessel proceeded to Australian ports.
S. S. Comerio.....	do.....	1		At sea, en route to Durban, S. A., from Sydney, Australia. (Public Health Reports, June 23, 1922, p. 1555.)
Schr. Fancy Me.....	May 28.....			At St. Thomas, Virgin Islands. From San Pedro de Macoris, Dominican Republic. One case removed to quarantine June 5, died June 18.
S. S. Montoro.....	July 8.....	1		At Darwin, Australia. Vessel left Singapore June 28 for Darwin via Java ports; Case, Chinese, developed July 4. Case landed at quarantine; vessel proceeded in quarantine to Sydney, via northern ports.
S. S. Shelley.....	Apr. 19.....	1		At sea, en route from Hongkong. Vessel left Hongkong Apr. 17. Arrived Thursday Island quarantine, Australia, Apr. 28, 1922. Case, member of crew; type, confluent hemorrhagic.
S. S. St. Albans.....	May 18.....	1		At Thursday Island quarantine, Australia. Case in person of Chinese steerage passenger. Vessel left Shimonoseki, Japan, for Melbourne via Hongkong and Manila. Left Thursday Island for Australian ports.

TYPHUS FEVER.

Algeria:				
Algiers.....	May 1-31.....	16	4	
Oran.....	June 1-30.....	3	1	
Do.....	July 1-Aug. 10.....		3	
Asia Minor:				
Smyrna.....	May 14-June 24.....	8		City and district. Corrected report.
Do.....	June 25-Aug. 19.....	11		District.
Austria:				
Vienna.....	May 7-June 10.....	3	1	
Do.....	July 2-15.....	2	1	
Australia:				
Brisbane.....	July 9-15.....	1		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 1 to September 29, 1922—Continued.

TYPHUS FEVER—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Bolivia:				
La Paz.....	Mar. 1-Apr. 30....	15	8	
Bulgaria:				
Sofia.....	May 28-June 17....	4		
Chile:				
Concepcion.....	Apr. 11-May 29....		10	
Do.....	June 27-July 31....		3	
Valparaiso.....	Apr. 2-22.....		6	
Do.....	July 18-24.....		1	
China:				
Antung.....	May 15-21.....	1		
Do.....	July 10-Aug. 20....	8		
Foochow.....	May 14-20.....	1		
Do.....	Aug. 6-12.....	4		
Hankow.....	July 9-15.....	1	1	
Manchuria—				
Harbin.....	May 8-June 11....	4		
Do.....	June 26-Aug. 5....	4		
Czechoslovakia:				
Prague.....	June 11-17.....	1		
Do.....	July 1-31.....	1	1	
Sanzig (Free City).....	June 4-10.....	1		
Egypt:				
Alexandria.....	June 4-24.....	9	6	
Do.....	June 25-Aug. 19....	16	7	July 22-29: 1 imported paratyphoid.
Cairo.....	Mar. 19-May 20....	61	40	Relapsing fever, Mar. 26-Apr. 8; 1 case.
Port Said.....	May 28-June 3....	1		
Do.....	July 2-Aug. 19....	1	3	
Germany:				
Berlin.....	Apr. 30-June 24....		7	May 1-6, 1922: Five cases typhus fever at quarantine station of Osternothafen, in persons returning from Russia.
Do.....	June 25-Aug. 12....		14	
Coblenz.....	July 2-Sept. 2....	11		
Königsberg.....	May 28-June 3....	1		
Stuttgart.....	July 22-Aug. 26....	2	1	
Greece:				
Saloniki.....	May 1-June 18....	25	1	2 in Russian refugees.
Mesopotamia:				
Bagdad.....	Apr. 1-June 30....	7	2	
Mexico: ¹				
Mexico City.....	Apr. 23-June 24....	111		Including municipalities in Federal District.
Do.....	June 25-Aug. 19....	119		Do.
Netherlands:				
Amsterdam.....	July 30-Aug. 5....	1		
Norway:				
Christiania.....	Aug. 15.....	1	1	
Province—				
Finmarken.....	July 26-Aug. 5....	12	2	Occurring in 3 localities.
Palestine:				
Jerusalem.....	June 27-Aug. 21....	2		
Persia:				
Teheran.....	Mar. 22-Apr. 22....		1	
Poland:				
Do.....				Mar. 26-Apr. 22, 1922: Cases, 5,695; deaths, 349. Apr. 23-June 24, 1922: Cases, 9,402; deaths, 631. Recurrent typhus—Mar. 26-Apr. 22, 1922: Cases, 4,515; deaths, 155. Apr. 23-May 6, 1922: Cases, 1,598; deaths, 34. (Corrected report.) May 7-June 24, 1922: Cases, 4,790; deaths, 111.
Do.....				June 25-July 8, 1922: Cases, 994; deaths, 86. Recurrent typhus—June 25-July 8, 1922: Cases, 1,016; deaths, 57.
Warsaw.....	Apr. 23-June 24....	156		Among transient and permanent residents.
Portugal:				
Oporto.....	May 4-June 24....	9	4	
Do.....	June 29-Aug. 19....	2	1	
Seixal.....	Aug. 1.....	1		Village opposite Lisbon.

¹The report of 1 death from typhus fever in Vera Cruz, Mex., Sept. 12, 1922, Public Health Reports, Sept. 29, 1922, pp. 2399 and 2403, was erroneous, investigation showing that the disease was typhoid fever.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 1 to September 29, 1922—Continued.

TYPHUS FEVER—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Rumania.....				Apr. 1-May 31, 1922: Cases, 62.
Cities—				
Bucharest.....	May 1-31.....	14		
Cerenauti.....	do.....	5		
Chisinau.....	Apr. 1-30.....	21		
Cluj.....	May 1-31.....	18		
Constanza.....	do.....	1		
Galata.....	do.....	1		
Sulina.....	do.....	2		
Provinces—				
Bucovina.....	Jan. 1-31.....	35	13	
Chisinau.....	Apr. 1-30.....	14		Recurrent typhus: Cases, 7.
Transylvania.....	Jan. 1-31.....	16	3	
Russia:				
Esthonia.....	Apr. 1-June 30.....	44		
Lettonia.....	do.....	635		Recurrent typhus: Cases, 40.
Spain:				
Barcelona.....	July 13-19.....		1	
Madrid.....	May 1-June 30.....		16	
Do.....	July 1-31.....		6	
Seville.....	May 21-June 3.....		1	
Tunis:				
Tunis.....	June 4-10.....	2		
Turkey:				
Constantinople.....	May 21-June 24.....	16		
Do.....	July 9-Aug. 26.....	20	3	
Union of South Africa				Apr. 1-June 30, 1922: Cases, 1,220; deaths, 214 (colored); white, 17 cases.
Cape Province.....				Apr. 1-June 30, 1922: Cases, 1,037; deaths, 194 (colored); white, 16 cases.
Do.....	July 23-29.....			Outbreaks.
Natal.....				Apr. 1-June 30, 1922: Cases, 57; deaths, 7 (colored).
Do.....	June 25-July 1.....			Outbreaks.
Orange Free State.....				Apr. 1-June 30, 1922: Cases, 97; deaths, 10 (colored); white, 1 case.
Transvaal.....				Apr. 1-June 30, 1922: Cases, 29; deaths, 2 (colored).
Do.....	June 18-July 29.....			Outbreaks.
Johannesburg.....	May 1-June 30.....	7	1	
Do.....	July 1-31.....	1		
Yugoslavia.....				Aug. 7-13, 1921: 2 new cases. (1921.)
Bosnia-Herzegovina.....	Aug. 7-13.....	1		
Croatia-Slavonia.....	Sept. 4-10.....	1		Do.
Serbia—				
Belgrade.....	May 6-June 3.....	2		
Volvodina.....	Aug. 7-13.....	1		(1921.)
From vessels:				
S. S. Chios.....	July 18.....	1		At Kavak quarantine station, Bosphorus, from Novorossysk, a Russian Black Sea port. Vessel carried refugees for Saloniki, Greece. Six bodies buried at sea, 12 cases landed at Kavak.
S. S. Smolensk.....	June 21.....	1	1	From Danzig, May 30, 1922. At embarkation detention camp, Southampton, England. (Public Health Reports, June 30, 1922, p. 1610.)

YELLOW FEVER.

Mexico:				
Tampico.....	July 27-29.....	1	1	From Panuco. Patient brought to Tampico on eighth day of illness.
Do.....	Aug. 30.....		6	Of these 5 with origin at Panuco, State of Vera Cruz; 1 with origin at Tampico.